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(54) DOCUMENT READ SYSTEM

(57) Abstract:

PROBLEM TO BE SOLVED: To reduce a misread rate when a recognized character is a character with a sonant mark or p-sound mark.

SOLUTION: This system is equipped with a character recognition part 23e which recognizes object characters and a display part 21b which displays character recognition results, etc. Further, the system is equipped with a sonant-mark and p-sound mark character detection part 23g and an image enlargement part 23h. The sonant-mark and p-sound mark character detection part operates when the character recognition part sends a rejection signal. Further, it detects whether or not candidate character for the recognized character (rejection expected recognized character), for which the rejection signal is sent, which were used for the process include a character with a sonant mark and/or p- sound mark. The image enlargement part operates when the sonant-mark and p-sound mark character detection part detects a character with a sonant mark and/or p-sound mark. Further, the source image of the rejection expected recognized character is enlarged and displayed at a display part.

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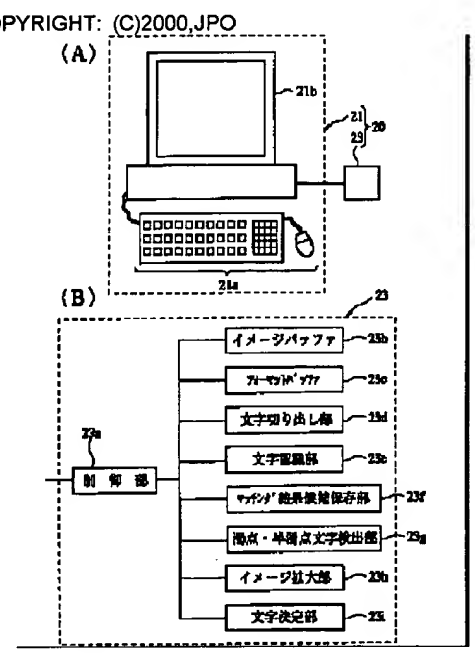

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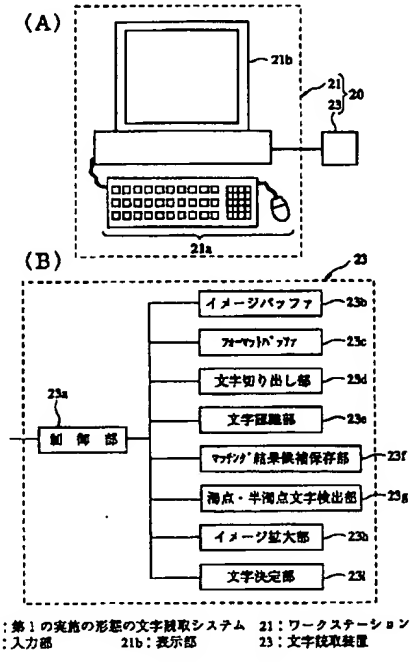
DA87 MM05 MM09

(54)【発明の名称】　文字読取システム

(57)【要約】
【課題】　被認識文字が濁点付き文字や半濁点付き文字である場合の誤読率を低減する。
【解決手段】　被認識文字に対して認識処理をする文字認識部２３ｅと、文字認識結果等を表示する表示部２１ｂとを具える。濁点・半濁点文字検出部２３ｇとイメージ拡大部２３ｈとを具える。濁点・半濁点文字検出部は、文字認識部がリジェクト信号を発した場合に動作する。然も、リジェクト信号を発することとした被認識文字（リジェクト予定被認識文字）の、前記処理で用いた候補文字中に、濁点付き文字および又は半濁点付き文字があるか否かを検出する。イメージ拡大部は、濁点・半濁点文字検出部が濁点付き文字および又は半濁点付き文字を検出した場合に動作する。然も、リジェクト予定被認識文字の原イメージを拡大して表示部に表示する。



20：第１の実施の形態の文字読取システム　21：ワークステーション
21a：入力部　21b：表示部　23：文字読取装置

第１の実施の形態の説明図

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【特許請求の範囲】

【請求項１】　被認識文字に対して認識処理をする文字認識部と、文字認識結果等を表示する表示部とを具える文字読取システムにおいて、

文字認識部がリジェクト信号を発した場合に動作し、該リジェクト信号を発することとした被認識文字（リジェクト予定被認識文字）の、前記認識処理で用いた候補文字中に、濁点付き文字および又は半濁点付き文字があるか否かを検出する、濁点・半濁点文字検出部と、

前記濁点・半濁点文字検出部が濁点付き文字および又は半濁点付き文字を検出した場合に動作し、前記リジェクト予定被認識文字の原イメージを拡大して前記表示部に表示するイメージ拡大部とを具えたことを特徴とする文字読取システム。

【請求項２】　被認識文字に対して認識処理をする文字認識部と、文字認識結果等を表示する表示部とを具える文字読取システムにおいて、

文字認識部がリジェクト信号を発した場合に動作し、該リジェクト信号を発することとした被認識文字（リジェクト予定被認識文字）の、前記認識処理で用いた候補文字中に、濁点付き文字および又は半濁点付き文字があるか否かを検出する、濁点・半濁点文字検出部と、

前記濁点・半濁点文字検出部が濁点付き文字および又は半濁点付き文字を検出した場合に動作し、前記リジェクト予定被認識文字の原イメージから、少なくとも２種類の２値化閾値に基づいて２以上の補正イメージをそれぞれ抽出して、これら補正イメージを前記表示部にそれぞれ表示する補正イメージ作成部とを具えたことを特徴とする文字読取システム。

【請求項３】　請求項２に記載の文字読取システムにおいて、

前記補正メージ作成部は、前記抽出したそれぞれの補正イメージを前記表示部に拡大して表示するものであることを特徴とする文字読取システム。

【請求項４】　請求項１に記載の文字読取システムにおいて、

前記イメージ拡大部は、前記濁点・半濁点文字検出部が検出した濁点文字および又は半濁点文字も併せて前記表示部に表示するものであり、

当該文字読取システムは、該表示された濁点文字および又は半濁点文字および前記拡大イメージに基づいて前記リジェクト予定被認識文字についての認識結果を決定する文字決定部をさらに具えることを特徴とする文字読取システム。

【請求項５】　請求項２に記載の文字読取システムにおいて、

前記補正イメージ作成部は、前記濁点・半濁点文字検出部が検出した濁点文字および又は半濁点文字も併せて前記表示部に表示するものであり、

当該文字読取システムは、該表示された濁点文字および

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又は半濁点文字および前記補正イメージに基づいて前記リジェクト予定被認識文字についての認識結果を決定する文字決定部をさらに具えることを特徴とする文字読取システム。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】この発明は、文字読取装置システムに関し、特に、被認識文字が濁点付き文字や半濁点付き文字である場合の誤読率の低減に有効な機能を持つ文字読取システムに関する。

【０００２】

【従来の技術】図７は従来の文字読取システム１０の一例を概略的に示した図である。特に図７（Ａ）は、文字読取システム１０の全体図、図７（Ｂ）は、文字読取システム１０に具わる文字読取装置１３の内部構成を示したブロック図である。

【０００３】この文字読取システム１０は、ワークステーション１１（以下、ＷＳ１１）と文字読取装置１３とで構成されている。

【０００４】ＷＳ１１は、入力部１１ａとしての例えばキーボードとマウス、および、表示部１１ｂとしての例えばＣＲＴを具える。このＷＳ１１は、文字読取装置１３による文字認識結果および又は被認識文字の読取イメージ等を、表示部１１ｂに表示させることができ、また、オペレータによる文字認識結果の確認および修正を可能にする。

【０００５】文字読取装置１３は、制御部１３ａ、イメージバッファ１３ｂ、フォーマットバッファ１３ｃ、文字切り出し部１３ｄおよび文字認識部１３ｅを具える。

【０００６】制御部１３ａは、文字読取装置１３全体の制御手段および上位装置であるＷＳ１１との通信手段（図示せず）の機能を持つ。イメージバッファ１３ｂは、媒体の画像イメージを記憶する。フォーマットバッファ１３ｃは、文字切り出し部１３ｄがイメージバッファ１３ｂから１文字毎に文字を切り出すためのフォーマット情報を記憶する。文字切り出し部１３ｄは、上記フォーマット情報に従いイメージバッファ１３ｂから１文字ごとの文字パターンを切り出す。文字認識部１３ｅは、文字パターンを所定の処理で認識して文字認識結果等を出力する。

【０００７】次に、この文字読取システム１０の動作について簡単に説明する。ＷＳ１１は任意の方法で取得した媒体の画像イメージと、文字の存在位置を予め定義した情報すなわちフォーマット情報とを、文字読取装置１３に渡す。文字読取装置１３では、制御部１３ａが、上記画像イメージをイメージバッファ１３ｂに、また、上記フォーマット情報をフォーマットバッファ１３ｃに、それぞれ格納する。文字切り出し部１３ｄは、このフォーマット情報から読取対象の文字位置を求め、この求めた文字位置に基づいてイメージバッファ１３ｂから１文

字ごとの文字パターンを切り出す。この文字パターンに、文字認識部１３ｅは、文字認識処理を行い、そして認識結果をＷＳ１１に返信する。ＷＳ１１は、認識結果に対応する文字キャラクタと、文字パターン（原イメージ）とを、表示部１１ｂに表示する。被認識文字列が例えば「バベル」である場合の、認識結果１５ｘおよび文字パターン（原イメージ）１５ｙを、図７（Ａ）中に示した。

【０００８】

【発明が解決しようとする課題】ところで、被認識文字が、濁点付き文字や半濁点付き文字（以下、「濁点付き文字等」という。）の場合がある。被認識文字が濁点付き文字等であって、濁点部分（濁点符）や半濁点部分（半濁点符）が、つぶれにより文字本体に接触している場合、この被認識文字が濁点付き文字等か否かを特定するのは、従来の文字読取システムにとって難しい。そのため、濁点付き文字等が被認識文字である場合、誤読する恐れが高いという問題点があった。

【０００９】従って、濁点付き文字等に対する誤読率を従来に比べて低減できる文字読取システムの実現が望まれる。

【００１０】

【課題を解決するための手段】そこで、この出願の第１の発明によれば、被認識文字に対して認識処理をする文字認識部と、文字認識結果等を表示する表示部とを具える文字読取システムにおいて、濁点・半濁点文字検出部と、イメージ拡大部とを具えることを特徴とする。

【００１１】ただし、濁点・半濁点文字検出部は、文字認識部がリジェクト信号を発した場合に動作するものである。然も、該リジェクト信号を発することとした被認識文字（これを、「リジェクト予定被認識文字」という）の、認識処理中で用いた候補文字中に、濁点付き文字および又は半濁点付き文字があるか否かを検出するものである。また、イメージ拡大部は、前述の濁点・半濁点文字検出部が濁点付き文字および又は半濁点付き文字を検出した場合に動作するものである。然も、前述のリジェクト予定被認識文字の原イメージを拡大して前述の表示部に表示するものである。

【００１２】この第１の発明の文字読取システムによれば、リジェクト信号が発せられた場合、自動的に、リジェクト予定被認識文字が、濁点付き文字または半濁点付き文字であるか否かの可能性が判定される。そして、可能性がある場合は、このリジェクト予定被認識文字の原イメージを自動的に拡大して表示部に表示する。拡大イメージとしたので、文字読取システムのオペレータは原イメージの濁点符や半濁点符の周辺部分の様子をより確認しやすい。従って、文字読取システムのオペレータは、この拡大イメージを見て、上記のリジェクトの原因が、濁点部分（濁点符）や半濁点部分（半濁点符）がつぶれて文字本体に接していたためか否か等を判定できる。然も、この拡大イメージを見て、これに対応する被認識文字（すなわちリジェクト予定被認識文字）の本来の文字を例えばキーボードで入力する等の修正ができるので、リジェクト予定被認識文字はリジェクトされずに済む。従って、被認識文字が濁点付き文字や半濁点付き文字である場合の誤読率の低減が図れる。

【００１３】なお、この第１の発明の場合、原イメージは、文字読取システムが何らかの形で取得した媒体の画像イメージ（例えば、スキャナで読み取ったイメージやデータベース中のイメージ）でも良いし、文字切り出し部が切り出した文字パタンでも良い。ただし、処理の簡便さからして、リジェクト予定被認識文字の文字パタンとするのが好ましい。

【００１４】また、この出願の第２の発明によれば、被認識文字に対して認識処理をする文字認識部と、文字認識結果等を表示する表示部とを具える文字読取システムにおいて、濁点・半濁点文字検出部と、補正イメージ作成部とを具えることを特徴とする。

【００１５】ただし、濁点・半濁点文字検出部は、文字認識部がリジェクト信号を発した場合に動作するものである。然も、該リジェクト信号を発することとした被認識文字（これを、「リジェクト予定被認識文字」という）の、認識処理で用いた候補文字中に、濁点付き文字および又は半濁点付き文字があるか否かを検出するものである。また、補正イメージ作成部は、前述の濁点・半濁点文字検出部が濁点付き文字および又は半濁点付き文字を検出した場合に動作するものである。然も、前述のリジェクト予定被認識文字の原イメージから、少なくとも２種類の２値化閾値に基づいて２以上の補正イメージをそれぞれ抽出して、これら補正イメージを前述の表示部にそれぞれ表示するものである。

【００１６】この第２の発明の文字読取システムによれば、リジェクト信号が発せられた場合、自動的に、リジェクト予定被認識文字が濁点付き文字または半濁点付き文字か否かの可能性が判定される。そして、可能性がある場合は、このリジェクト予定被認識文字の原イメージから２値化閾値を違えた２以上の補正イメージを自動的に抽出して表示部にそれぞれ表示する。これら補正イメージは、濁点部分（濁点符）や半濁点部分（半濁点符）の画像濃度や、濁点符等と文字本体部との間の部分の画像濃度が異なるイメージである。従って、これら補正イメージ中には、文字読取システムのオペレータが、リジェクト予定被認識文字が濁点付き文字や半濁点付き文字かどうかを判断し易いイメージが含まれる。また、この補正イメージを見て、上記のリジェクトの原因が、濁点部分（濁点符）や半濁点部分（半濁点符）がつぶれて文字本体に接していたためか否か等を判定できる。然も、この補正イメージを見て、これに対応する被認識文字（すなわちリジェクト予定被認識文字）の本来の文字を例えばキーボードで入力する等の修正ができるので、リ

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ジェクト予定被認識文字はリジェクトされずに済む。従って、被認識文字が濁点付き文字や半濁点付き文字である場合の誤読率の低減が図れる。

【００１７】なお、この第２の発明の場合、原イメージは、文字読取システムが何らかの形で取得した媒体の画像イメージ（例えば、スキャナで読み取ったイメージやデータベース中のイメージ）、すなわち、文字切り出し部が切り出す前のイメージとするのが良い。また、この第２の発明の場合、好ましくは、原イメージは多値で表されたイメージとするのが良い。また、この第２の発明でいう２値化閾値とは、多値イメージに対して異なる値に設定される閾値でも良いし、２値イメージに対して、黒画素の塊具合等で白画素、黒画素とを区別するような閾値の場合であっても良い。なお、後者の場合（すなわち黒画素の塊具合等を閾値とする場合）であれば、原イメージは、多値イメージでなく２値のイメージでも済む。

【００１８】また、この第２の発明を実施するに当たり、補正イメージを拡大して表示するのが好ましい。こうすれば、オペレータは、原イメージの濁点符や半濁点符の辺りが一層見易くなる。

【００１９】また、これら第１および第２の発明を実施するに当たり、好ましくは、前述のイメージ拡大部若しくは補正メージ作成部を、前述の濁点・半濁点文字検出部が検出した濁点文字および又は半濁点文字も前述の表示部に併せて表示する構成とし、そして、文字読取システムは、該表示された濁点文字および又は半濁点文字と、前述の拡大イメージ（補正イメージ作成部の場合は補正イメージ）に基づいて、前述のリジェクト予定被認識文字についての認識結果を決定する文字決定部をさらに具える構成とするのが良い。

【００２０】この好ましい構成によれば、オペレータは、候補文字と原イメージであって拡大されたイメージ（補正イメージ作成部の場合は補正イメージ）を同じ表示部上で対比できる。この候補文字中には、このリジェクト予定被認識文字の真の認識結果の蓋然性（確率）が高い文字が含まれていることが多い。従って、オペレータによる認識結果の決定をよりし易くできる。

【００２１】

【発明の実施の形態】以下、図面を参照してこの発明の文字読取システムの実施の形態について説明する。しかしながら、説明に用いる各図は、これら発明を理解できる程度に概略的に示してあるにすぎない。また、各図において、同様な構成成分については、同一の番号を付して示し、その重複する説明を省略することもある。

【００２２】１．第１の実施の形態

図１は第１の実施の形態の文字読取システム２０を説明する図である。特に図１（Ａ）は全体図、図１（Ｂ）は文字読取装置２３の内部構成を示したブロック図である。

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【００２３】第１の実施の形態の文字読取システム２０は、ワークステーション２１（パソコンも含む。以下、ＷＳ２１）と文字読取装置２３とで構成してある。もちろん、文字読取装置２３が、ＷＳ２１に対して外付けの場合、または、ＷＳ２１内にコンピュータプログラム等の形態で内蔵される場合（すなわち、ＷＳ２１自体で文字読取システム２０が構成される場合）いずれでも良い。

【００２４】ＷＳ２１は、入力部２１ａとしての例えばキーボードとマウス、および、表示部２１ｂとしての例えばＣＲＴを具えている。

【００２５】このＷＳ２１は、文字読取装置２３からの文字認識結果および被認識文字の読取イメージを表示部２１ｂに表示でき、また、オペレータによる文字認識結果の確認および修正を可能にする。

【００２６】ここで、表示部２１ｂに表示する文字認識結果とは、典型的には、例えばＪＩＳ文字コードに対応するキャラクタであり、また、リジェクト時はリジェクトを示す旨の任意の表示例えば「？」表示である。さらにこの発明では、リジェクト予定被認識文字の文字認識結果として、文字認識部２３ｅで最終的な候補文字とはされなかったが、認識処理において被認識文字に対してある程度類似したと扱われた候補文字を、用いても良い。詳細は後述するが、一般に、文字認識部２３ｅは、被認識文字に対して図２（Ａ）に示した様に距離の近い文字を順に並べて候補文字を挙げるマッチング部と、マッチング部が挙げた候補文字についてさらに詳しくパタンを見て最終的な候補文字を挙げる詳細識別部とを含むことが多い。従って、候補文字が挙がっても詳細識別部が、何らかの理由でリジェクトと判断する場合がある。反面、最終的な候補文字ではないものでも、マッチング部で用いた候補文字の一部又は全部は、リジェクト予定被認識文字の認識結果として、後に表示部２１ｂに表示することが可能になる（詳細は後述する）。そして、このような候補文字を表示できれば、文字読取システムのオペレータは、このような候補文字を認識結果を決定するための選択候補として利用できるので、リジェクト予定被認識文字の認識結果の決定が行い易いと考えられるからである。

【００２７】一方、読取イメージとは、被認識文字の原イメージであり、例えば、イメージバッファ２３ｂ（後述する）に格納されたイメージでも良く、または、文字切り出し部２３ｄが切り出した文字パタンでも良い。

【００２８】文字読取装置２３は、制御部２３ａ、イメージバッファ２３ｂ、フォーマットバッファ２３ｃ、文字切り出し部２３ｄ、文字認識部２３ｅ、マッチング結果候補保存部２３ｆ、濁点・半濁点文字検出部２３ｇ、イメージ拡大部２３ｈおよび文字決定部２３ｉを具える。

【００２９】これら各構成成分２３ａ～２３ｉは、典型

的には、ＣＰＵ、メモリ、ＷＳ２１の入力部２１ａおよびコンピュータプログラムを組み合わせることによって、実現することができる。

【００３０】文字読取装置２３に具わる制御部２３ａは、文字読取装置２３全体の制御手段および上位装置であるＷＳ２１との通信手段（図示せず）の機能をを持つ。

【００３１】また、イメージバッファ２３ｂは、媒体の画像イメージを記憶する。また、フォーマットバッファ２３ｃは、文字切り出し部２３ｄがイメージバッファ２３ｂから１文字毎に文字を切り出すためのフォーマット情報を記憶する。

【００３２】また、文字切り出し部２３ｄは、上記フォーマット情報に従いイメージバッファ２３ｂから１文字ごとの文字パタンを切り出す。

【００３３】また、文字認識部２３ｅは、文字パターンを任意好適な文字認識手法により処理して文字認識結果を出力する。この文字認識部２３ｅは、上述した様に、マッチング部と詳細識別部とを具える構成とするのが良い。

【００３４】ここで、媒体とは、文字読取対象の文字、記号等が書かれた（もちろん印刷も含む）任意のものをいう。また媒体の画像イメージとは、媒体から画像読取装置（スキャナ等）で読み取った画像イメージの場合、または、別途に用意されたデータベース中の画像イメージ等、任意のものをいう。

【００３５】また、マッチング結果候補保存部２３ｆは、文字認識部２３ｅでの文字認識処理中で、被認識文字の文字パターンと、認識辞書中の標準パターンとのマッチングを行って得られた候補文字を一時的に保存する。

【００３６】また、濁点・半濁点文字検出部２３ｇは、文字認識部２３ｅがリジェクト信号を発した場合に動作し、該リジェクト信号を発することとした被認識文字（すなわち、リジェクト予定被認識文字）の、認識処理で用いた候補文字中に（この実施の形態ではマッチング結果候補保存部２３ｆ中に）、濁点付き文字および又は半濁点付き文字があるか否かを検出する。

【００３７】この濁点付き文字および又は半濁点付き文字があるか否かの検出は、例えば、マッチング結果候補保存部２３ｆ中に保存されている候補文字のＪＩＳ文字コードが、濁点付き文字や半濁点付き文字の文字コードに該当するか否かを調べることで、行える。

【００３８】また、イメージ拡大部２３ｈは、濁点・半濁点文字検出部２３ｇが、リジェクト予定被認識文字の候補文字中に、濁点付き文字および又は半濁点付き文字を検出した場合に、このリジェクト予定被認識文字の原イメージ、この例では文字パタンを拡大して表示部２１ｂに表示する。

【００３９】イメージ拡大部２３ｈによる原イメージの

拡大倍率は、オペレータが見易いと思われる倍率に予め設定しておくのが良い。この設定値はフォーマットバッファに格納しておくのが良い。また、設定した倍率は、後に（作業時も含め）、ＷＳ２１の入力部２１ａからオペレータが任意に変更できる構成としておくのが良い。

【００４０】また、文字決定部２３ｉは、リジェクト予定被認識文字の最終的な認識結果を決定する。この文字決定部２３ｉは、表示部２１ｂに表示された、リジェクト予定被認識文字の拡大した原イメージを見たオペレータによる指示で、この被認識文字の認識結果を決めるものである。例えば、オペレータが、上記の拡大表示されたイメージを見て、それに応じた文字をキーボードから入力する等の構成とできる。

【００４１】ただし、イメージ拡大部２３ｈおよび文字決定部２３ｉそれぞれを、以下の様な構成としても良い。

【００４２】すなわち、イメージ拡大部２３ｈを、リジェクト予定被認識文字の原イメージを拡大したイメージと共に、濁点・半濁点文字検出部２３ｇが検出した候補文字も表示部２１ｂに併せて表示する構成とし、文字決定部２３ｉを、表示部２１ｂに併せて表示された濁点・半濁点候補文字と上記拡大したイメージとに基づいて、リジェクト予定被認識文字の文字認識結果を決定する構成とするのが良い。こうしておくと、オペレータは、表示部２１ｂに表示された濁点・半濁点文字と、リジェクト予定被認識文字の原イメージを拡大したイメージとを、同時に見ることができるので、リジェクト予定被認識文字の正当な認識結果を決定し易くなるからである。この様な好適例の文字決定部２３ｉは、例えば、オペレータが、上記表示部２１ｂに表示された、濁点付き文字および又は半濁点付き文字と、前記拡大した原イメージとを見比べて、希望する文字を例えばマウスでクリックしたり、候補文字に予め付けた１，２・・等の番号のうちの希望する文字の番号をキーボードで入力する等で文字を決定する手法で、実現できる。

【００４３】次に、この第１の実施の形態の文字読取システム２０の理解を深めるために、その動作について説明する。

【００４４】ＷＳ２１は任意の方法で取得した読取イメージと、文字の存在位置を予め定義した情報すなわちフォーマット情報とを、文字読取装置２３に渡す。文字読取装置２３では、制御部２３ａが、上記読み取りイメージをイメージバッファ２３ｂに、また、上記フォーマット情報をフォーマットバッファ２３ｃに、それぞれ格納する。文字切り出し部２３ｄは、このフォーマット情報から読取対象の文字位置を求め、この求めた文字位置に基づいてイメージバッファ２３ｂから１文字ごとの文字パターンを切り出す。この文字パターンに文字認識部２３ｅは、文字認識処理を行い、そして読取結果をＷＳ２１に返信する。また、マッチング結果候補保存部２３ｆ

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は、文字認識部２３ｅが抽出した候補文字、具体的には候補文字の例えばＪＩＳ文字コードを、保存する。

【００４５】図２（Ａ）は、被認識文字列が「バベル」である場合の、被認識文字「バ」、「ベ」および「ル」それぞれについて、第１～第３位までの候補文字が挙がった例を示した図である。これら候補文字の例えばＪＩＳ文字コードを、マッチング結果候補保存部２３ｆは、保存する。

【００４６】文字認識部２３ｅが所定の処理により上記候補文字の中から認識結果として最終的な候補文字を挙げた場合は、文字読取システム２０は、次の被認識文字についての文字認識処理を実施する。

【００４７】ところが、被認識文字について文字認識部２３ｅが認識結果としてリジェクト信号を出力した場合、濁点・半濁点文字検出部２３ｇが、動作を開始する。そして、濁点・半濁点文字検出部２３ｇは、このリジェクト予定被認識文字についての、マッチング候補保存部２３ｆに保存されている候補文字の中に、濁点付き文字や半濁点付き文字が在るか否かを、例えば濁点・半濁点付き文字用のコード表と比較して検出する。このコード表の一例を図２（Ｂ）に示した。

【００４８】濁点付き文字や半濁点付き文字が検出された場合、イメージ拡大部２３ｈは、このリジェクト予定被認識文字の原イメージ（この例では文字切り出しで得られている文字パターン）を、表示部２１ｂに拡大して表示させる。図３は、その表示例を示している。すなわち、被認識文字列「バベル」の中の、「ベ」という被認識文字が、リジェクト予定被認識文字となったため、それの原イメージが拡大されて表示された例を示してある。なお、リジェクト信号でなかった被認識文字については、任意の表示と出来る。たとえば、原イメージのまま表示する等である。図３はその例である。また、この図３の例では、被認識文字であって、最終的な認識結果が得られたものについては、その文字のキャラクタを表示部２１ｂに併せて示し、リジェクト予定被認識文字の認識結果としては、リジェクトを示す旨の表示「？」を示した例である。ただし、先に説明した様に、リジェクト予定被認識文字の認識結果として、文字認識途中で用いた候補文字であって、濁点付き文字および又は半濁点付き文字である候補文字を表示するようにしても良い。

【００４９】この図３の例の場合、文字読取システムのオペレータは、被認識文字「ベ」の原イメージが拡大表示されたので、これがリジェクト予定被認識文字であると分かる。そして、この拡大表示されたイメージを見て、この被認識文字の認識結果を決定できる。例えば、キーボードからこのイメージに対応する文字を入力する方法等で、認識結果を決定できる。

【００５０】この第１の実施の形態の文字読取装置２０によれば、リジェクト予定の被認識文字が濁点付き文字等の可能性がある場合、自動的に、その原イメージが表

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示部に拡大表示される。そのため、例えばオペレータが適切な処理を行える。例えば、正しい文字コードをオペレータが入力する等の処理を行える。そのため、リジェクトされずに済むので、濁点付き文字や半濁点付き文字の文字つぶれ等に起因する誤読を低減することができる。

【００５１】また、好適例の様に、イメージ拡大部２３ｈが被認識文字の原イメージを拡大したイメージと、候補文字中から検出された濁点付き文字および又は半濁点付き文字を併せて表示部２１ｂに表示し、かつ、文字決定部２３ｉがこれらに基づいて認識結果を決定する構成の場合、オペレータの判断作業および修正作業を行い易くできる。

【００５２】２．第２の実施の形態

図４は、第２の実施の形態の文字読取システム３０の説明図である。特に図４（Ａ）は全体図、図４（Ｂ）は文字読取装置３１の内部構成を示したブロック図である。

【００５３】この第２の実施の形態の文字読取システム３０は、ＷＳ２１と文字読取装置３１とで構成してある。

【００５４】ＷＳ２１は、第１の実施の形態にて説明したと同様な構成のものとできるので、その説明を省略する。

【００５５】また、文字読取装置３１は、第１の実施の形態と同様に、制御部２３ａ、イメージバッファ２３ｂ、フォーマットバッファ２３ｃ、文字切り出し部２３ｄ、文字認識部２３ｅ、マッチング結果候補保存部２３ｆ、濁点・半濁点文字検出部２３ｇを具える。

【００５６】さらに、この第２の実施の形態の文字読取システム３０の文字読取装置３１は、第２の実施の形態の特徴として、補正メージ作成部３１ａと、文字決定部３１ｂとを具える。

【００５７】補正イメージ作成部３１ａは、濁点・半濁点文字検出部２３ｇが濁点付き文字および又は半濁点付き文字を検出した場合に動作する。そして、現在の被認識文字（リジェクト予定被認識文字）の原イメージ、この場合はイメージバッファ２３ｂに格納されている読取イメージから少なくとも２種類の２値化閾値に基づいて２以上の補正イメージをそれぞれ抽出する。然も、これら補正イメージを、表示部２１ｂにそれぞれ表示する。

【００５８】ここで、２値化閾値とは、イメージバッファ２３ｂからイメージを抽出する際の濃度閾値である。具体的には、フォーマットバッファ２３ｃに格納されているフォーマット情報で決まるイメージバッファ２３ｂ上の文字領域から、ある濃度以上の画素を被認識文字のイメージとして抽出する時の、濃度閾値である。２値化閾値を違えることでその値毎のイメージを抽出することができる（詳細は、動作の説明の際に説明する。）。この２値化閾値は、文字読取システムのオペレータにとって見易いイメージが作成できるような値を含むように、

複数設定するのが良い。これら２値化閾値は、例えば、フォーマットバッファ２３ｃに予め格納するか、適時、キーボード等からオペレータが入力する等で、用意するのが良い。また、２値化閾値は、後に（作業時も含む）、オペレータにより値を変更できる構成とするのがよい。

【００５９】この補正イメージ作成部３１ａは、より好ましくは、作成したイメージそれぞれを拡大して表示部２１ｂに表示する構成とするのが良い。こうすると、オペレータが２値化閾値ごとのイメージを見易くなるからである。

【００６０】補正イメージ作成部３１ａを、作成したイメージを拡大表示する構成のものとする場合、原イメージの拡大倍率は、オペレータが見易いと思われる倍率に予め設定しておくのが良い。この設定値は例えばフォーマットバッファに格納するのが良い。また、設定した倍率は、後に（作業時も含め）、ＷＳ２１の入力部２１ａからオペレータが任意に変更できる構成としておくのが良い。

【００６１】また、文字決定部３１ｂは、リジェクト予定被認識文字の最終的な認識結果を選択する。この文字決定部３１ｂは、表示部２１ｂに表示された上記の補正イメージを見たオペレータの指示で、この被認識文字の認識結果を決める。例えば、オペレータが、上記の補正イメージを見て、それに応じた文字をキーボードから入力する構成とできる。

【００６２】ただし、補正イメージ作成部３１ａおよび文字決定部３１ｂそれぞれを、以下の様な構成としても良い。

【００６３】すなわち、補正イメージ作成部３１ａを、リジェクト予定被認識文字の原イメージから２値化閾値を変えて抽出した補正イメージと共に、濁点・半濁点文字検出部２３ｇが検出した候補文字も表示部２１ｂに併せて表示する構成とする。そして、文字決定部３１ｂを、表示部２１ｂに併せて表示された濁点・半濁点候補文字と上記補正イメージとに基づいて、リジェクト予定被認識文字の文字認識結果を決定する構成とするのが良い。こうしておくと、オペレータは、表示部２１ｂに表示された濁点・半濁点文字と、リジェクト予定被認識文字の補正イメージ（拡大されたものも含む）とを、同時に見ることができるので、リジェクト予定被認識文字の正当な認識結果を決定し易くなるからである。

【００６４】次に、この第２の実施の形態の文字読取システム３０の理解を深めるために、その動作について説明する。

【００６５】ＷＳ２１は任意の方法で取得した読取イメージと、文字の存在位置を予め定義した情報すなわちフォーマット情報とを、文字読取装置３１に渡す。文字読取装置３１では、制御部２３ａが、上記読み取りイメージをイメージバッファ２３ｂに、また、上記フォーマット情報をフォーマットバッファ２３ｃに、それぞれ格納する。文字切り出し部２３ｄは、このフォーマット情報から読取対象の文字位置を求め、この求めた文字位置に基づいてイメージバッファ２３ｂから１文字ごとの文字パターンを切り出す。この文字パターンに文字認識部２３ｅは、文字認識処理を行い、そして読取結果をＷＳ２１に返信する。また、マッチング結果候補保存部２３ｆは、文字認識部２３ｅが抽出した候補文字、具体的には候補文字の例えばＪＩＳ文字コードを、保存する。

【００６６】文字認識部２３ｅが所定の処理により上記候補文字の中から認識結果として最終的な候補文字を挙げた場合は、文字読取システム３０は、次の被認識文字についての文字認識処理を実施する。

【００６７】ところが、被認識文字について文字認識部２３ｅが認識結果としてリジェクト信号を出力した場合、濁点・半濁点文字検出部２３ｇが、動作を開始する。そして、濁点・半濁点文字検出部２３ｇは、このリジェクト予定被認識文字についての、マッチング結果候補保存部２３ｆに保存されている候補文字の中に、濁点付き文字や半濁点付き文字があるか否かを、例えば濁点・半濁点付き文字用のコード表と比較して検出する。

【００６８】濁点付き文字や半濁点付き文字が検出された場合、補正イメージ作成部３１ａは、このリジェクト予定被認識文字の原イメージ（この例ではイメージバッファ２３ｂに保存されているイメージ）から、少なくとも２種類の２値化閾値を用いて、補正イメージをそれぞれ抽出する。この２値化閾値は、予め例えばフォーマットバッファ２３ｃに格納しておいて、そこから、補正イメージ作成部３１ａが必要時に読み出す構成とするのが良い。なお、オペレータによって、この２値化閾値を変更できる構成とするのが、更に良い。

【００６９】図５（Ａ）および（Ｂ）は補正イメージの抽出処理を説明する図である。図５（Ａ）には、２値化閾値を、第１～第３の値Ｘ１、Ｘ２およびＸ３、例えば８０、８５、９０の３種類とし、イメージバッファ２３ｂをそれぞれ走査して（すなわち３回走査して）、３種類の補正イメージを抽出することを、示している。また、図５（Ｂ）は、リジェクト予定被認識文字が「バ」である場合で、２値化閾値を第１～第３の値とした場合それぞれで抽出される第１～第３の補正イメージ３３ａ～３３ｃを示している。

【００７０】こうして抽出された補正イメージ３３ａ～３３ｃは、それぞれ表示部２１ｂに表示される。然も、この例の場合、拡大して表示される。然も、認識結果と併せて表示される。図６は、その表示例を示した図である。「バ」の文字のみがリジェクト予定被認識文字であったので、その文字について拡大されて、かつ、異なる補正イメージとして示されている。然も、「バ」の文字の認識結果として、リジェクトを示す旨の表示「？」が表示されている。ただし、この認識結果として濁点・半

濁点文字検出部２３ｇで検出された濁点付き文字および又は半濁点付き文字を表示しても良い。

【００７１】この図６の例の場合、文字読取システムのオペレータは、被認識文字「バ」のイメージが補正イメージ３３ａ～３３ｃであるので、この文字がリジェクト予定被認識文字であると分かる。そして、これら補正イメージを見て、この被認識文字の認識結果を決定できる。例えば、キーボードからこのイメージに対応する文字を入力する方法等で、認識結果を決定できる。

【００７２】この第２の実施の形態の文字読取装置３０によれば、リジェクト予定の被認識文字が濁点付き文字等の可能性がある場合、自動的に、その文字の原イメージから異なる２値化閾値による補正イメージが抽出されてそれらが表示部に表示される。そのため、例えばオペレータが、これら補正イメージ中の見易い（最適な）補正イメージを見て、適切な処理を行える。例えば、正しい文字コードをオペレータが入力する等の処理を行える。そのため、リジェクトされずに済むので、濁点付き文字や半濁点付き文字の文字つぶれ等に起因する誤読を低減することができる。

【００７３】また、好適例の様に、補正イメージ作成部３１ａが被認識文字の補正イメージと、候補文字中から検出された濁点付き文字および又は半濁点付き文字を併せて表示部２１ｂに表示し、かつ、文字決定部３１ｂがこれらに基づいて認識結果を決定する構成の場合、オペレータの判断作業および修正作業を行い易くできる。

【００７４】上述においては、この発明の文字読取システムの実施の形態について説明した。しかし、これらの発明は上述の実施の形態に何ら限定されるものではなく、多くの変形又は変更を行うことができる。

【００７５】例えば、上述の第１および第２の実施の形態では、イメージバッファから文字切り出し部が文字を切り出すためにフォーマット情報を用いる例を説明した。しかし、文字切り出し手法はこの例に限られず、任意好適な方法で良い。例えば、文字切り出し部自体がイメージバッファを走査して１文字ごとの境界を検出して、それに基づいて文字を切り出すという様な手法であっても良い。

【００７６】

【発明の効果】上述した説明から明らかなように、この出願の第１の発明の文字読取システムによれば、リジェクト予定の被認識文字が濁点付き文字等の可能性があるか否かを判定し、そうであった場合は、この被認識文字の原イメージを拡大して表示部に表示する。また、この出願の第２の発明の文字読取システムによれば、リジェクト予定の被認識文字が濁点付き文字等の可能性があるか否かを判定し、そうであった場合は、この被認識文字の原イメージから異なる２値化閾値により複数の補正イメージを抽出してそれを表示部に表示する。したがって、この表示により、文字読取システムのオペレータに、濁点付き文字等に起因するリジェクトである旨の注意を促すことが出来ると共に、オペレータは、この表示を見てリジェクト予定の被認識文字の認識結果を修正できる。そのため、リジェクト予定の被認識文字を救済できるので、濁点付き文字や半濁点付き文字の文字つぶれ等に起因する誤読を低減することができる。

【図面の簡単な説明】

【図１】第１の実施の形態の文字読取システム２０の全体構成および文字読取装置２３の内部構成を説明する図である。

【図２】候補文字を説明する図である。

【図３】第１の実施の形態で表示部に表示される表示例を説明する図である。

【図４】第２の実施の形態の文字読取システム３０の全体構成および文字読取装置３１の内部構成を説明する図である。

【図５】補正イメージを抽出する処理を説明する図である。

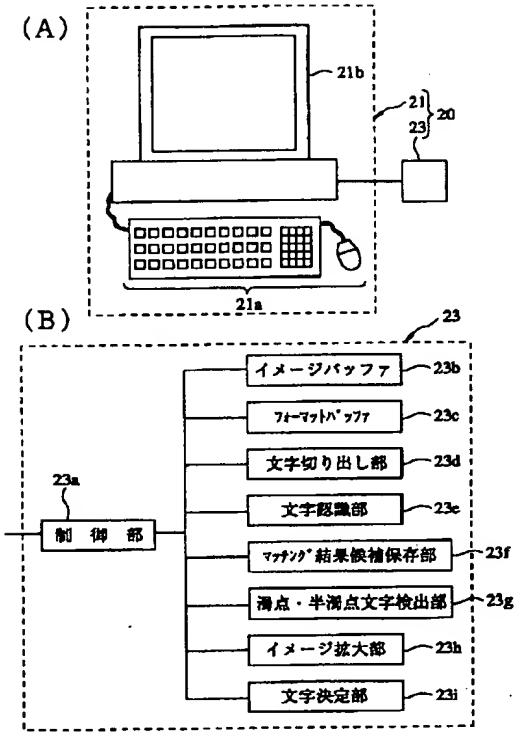
【図６】第２の実施の形態で表示部に表示される表示例を説明する図である。

【図７】従来技術の説明図である。

【符号の説明】

２０：第１の実施の形態の文字読取システム
２１：ワークステーション
２１ａ：入力部
２１ｂ：表示部
２３：文字読取装置
２３ａ：制御部
２３ｂ：イメージバッファ
２３ｃ：フォーマットバッファ
２３ｄ：文字切り出し部
２３ｅ：文字認識部
２３ｆ：マッチング結果候補保存部
２３ｇ：濁点・半濁点文字検出部
２３ｈ：イメージ拡大部
２３ｉ：文字決定部
３０：第２の実施の形態の文字読取システム
３１：文字読取装置
３３ａ～３３ｃ：補正イメージ

【図１】



20 ：第１の実施の形態の文字読取システム　21：ワークステーション
21a：入力部　　21b：表示部　　23：文字読取装置

第１の実施の形態の説明図

【図２】

(A)

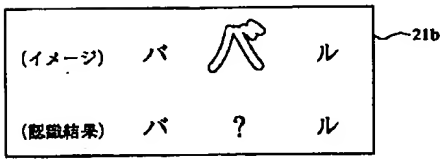
	第１位	第２位	第３位
「パ」の認識結果	パ	パ	ハ
「ペ」の認識結果	ペ	ペ	ヘ
「ル」の認識結果	ル	レ	ハ

(B)

カ	ガ	
：		
ハ	バ	パ
：	：	：
ヘ	ベ	ペ

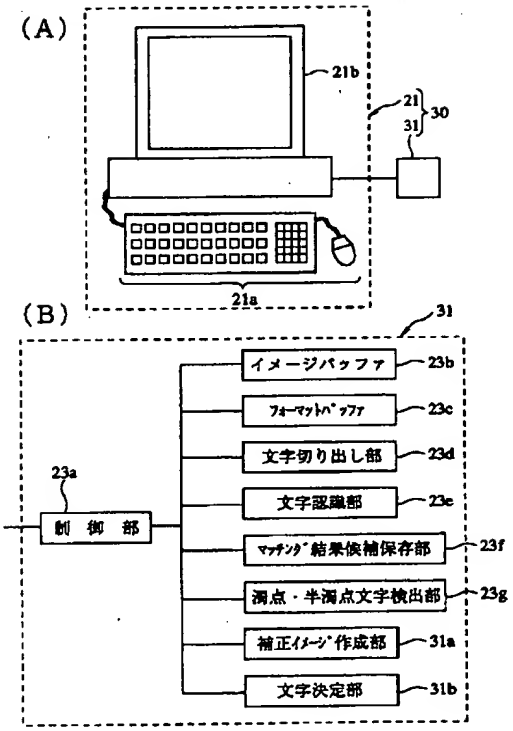
候補文字を説明する図

【図３】



表示部に表示される表示例を説明する図

【図４】



30 ：第２の実施の形態の文字読取システム　21：ワークステーション
21a：入力部　　21b：表示部　　31：文字読取装置

第２の実施の形態の説明図

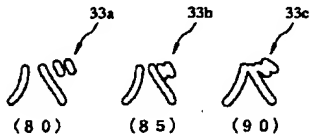
【図５】

(A)

スキャン回数	3
２値化閾値	８０、８５、９０
：	：

（既取フォーマット情報）

(B)

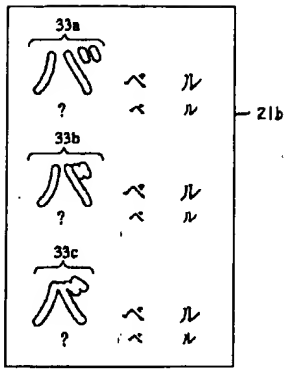


（既取イメージ）

33a～33c：第１～第３の補正イメージ

補正イメージを抽出する処理の説明図

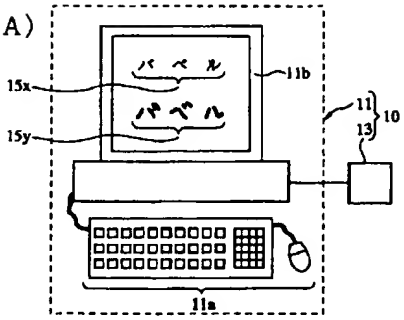
【図６】



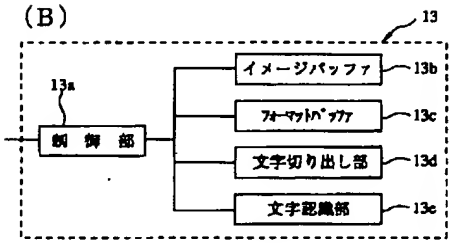
第２の実施の形態での表示例を説明する図

【図７】

(A)



(B)



従来技術の説明図

PATENT ABSTRACTS OF JAPAN

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// G09G 5/373

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(22)Date of filing : 07.10.1998

(71)Applicant : OKI ELECTRIC IND CO LTD

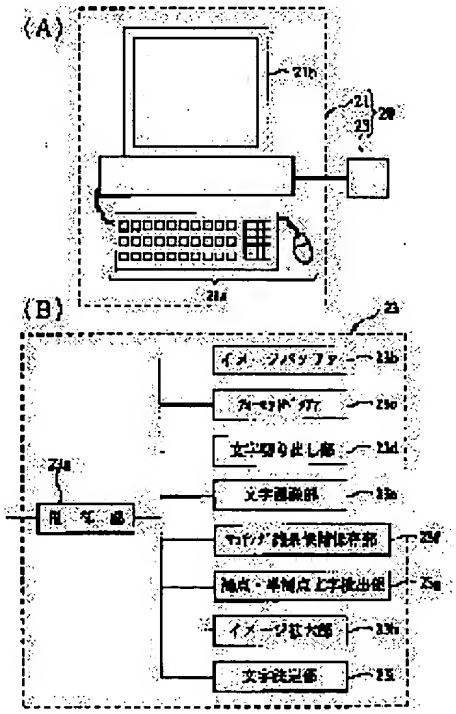
(72)Inventor : HAYASHI YUJI

(54) DOCUMENT READ SYSTEM

(57)Abstract:

PROBLEM TO BE SOLVED: To reduce a misread rate when a recognized character is a character with a sonant mark or p-sound mark.

SOLUTION: This system is equipped with a character recognition part 23e which recognizes object characters and a display part 21b which displays character recognition results, etc. Further, the system is equipped with a sonant-mark and p-sound mark character detection part 23g and an image enlargement part 23h. The sonant-mark and p-sound mark character detection part operates when the character recognition part sends a rejection signal. Further, it detects whether or not candidate character for the recognized character (rejection expected recognized character), for which the rejection signal is sent, which were used for the process include a character with a sonant mark and/or p- sound mark. The image enlargement part operates when the sonant-mark and p-sound mark character detection part detects a character with a sonant mark and/or p-sound mark. Further, the source image of the rejection expected recognized character is enlarged and displayed at a display part.



LEGAL STATUS

[Date of request for examination]

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[Date of final disposal for application]

[Patent number]

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[Date of requesting appeal against examiner's decision of rejection]

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CLAIMS

[Claim(s)]
[Claim 1] In an alphabetic character reading system equipped with the character recognition section which carries out recognition processing to a recognized alphabetic character, and the display which displays a character recognition result etc. The recognized alphabetic character (alphabetic character recognized [rejection schedule]) to which it was presupposed that it operates when the character recognition section emits a rejection signal, and this rejection signal is emitted, the inside of the candidate alphabetic character used by said recognition processing -- an alphabetic character with a voice sound symbol -- and -- or whether there is any alphabetic character with a semivoiced sound mark with the voice sound symbol and semivoiced sound mark alphabetic character detecting element to detect said voice sound symbol and semivoiced sound mark alphabetic character detecting element -- an alphabetic character with a voice sound symbol -- and -- or the alphabetic character reading system characterized by having the image limb which operates when an alphabetic character with a semivoiced sound mark is detected, expands the original image of said alphabetic character recognized [rejection schedule], and is displayed on said display.
[Claim 2] In an alphabetic character reading system equipped with the character recognition section which carries out recognition processing to a recognized alphabetic character, and the display which displays a character recognition result etc. The recognized alphabetic character (alphabetic character recognized [rejection schedule]) to which it was presupposed that it operates when the character recognition section emits a rejection signal, and this rejection signal is emitted, the inside of the candidate alphabetic character used by said recognition processing -- an alphabetic character with a voice sound symbol -- and -- or whether there is any alphabetic character with a semivoiced sound mark with the voice sound symbol and semivoiced sound mark alphabetic character detecting element to detect Or when an alphabetic character with a semivoiced sound mark is detected, it operates. said voice sound symbol and semivoiced sound mark alphabetic character detecting element -- an alphabetic character with a voice sound symbol -- and -- The alphabetic character reading system characterized by having the amendment image creation section which extracts two or more amendment images based on at least two kinds of binary-ized thresholds, respectively, and displays these amendment image on said display from the original image of said alphabetic character recognized [rejection schedule], respectively.
[Claim 3] It is the alphabetic character reading system characterized by being what said amendment MEJI creation section expands said each extracted amendment image to said display in an alphabetic character reading system according to claim 2, and displays.
[Claim 4] the voice-sound-symbol alphabetic character in which said voice sound symbol and semivoiced sound mark alphabetic character detecting element detected said image limb in the alphabetic character reading system according to claim 1 -- and -- or the voice-sound-symbol alphabetic character in which a semivoiced sound mark alphabetic character also displays on said display collectively, and the alphabetic character reading system concerned was this displayed -- and -- or the alphabetic character reading system characterized by to have further the alphabetic character decision

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h g cg b eb cg e e h g

section which determines the recognition result about said alphabetic character recognized [rejection schedule] based on a semivoiced sound mark alphabetic character and said expansion image.
[Claim 5] In an alphabetic character reading system according to claim 2 said amendment image creation section Or it is what also combines a semivoiced sound mark alphabetic character and is displayed on said display. the voice-sound-symbol alphabetic character which said voice sound symbol and semivoiced sound mark alphabetic character detecting element detected -- and -- the alphabetic character reading system concerned the displayed this voice-sound-symbol alphabetic character -- and -- or the alphabetic character reading system characterized by having further the alphabetic character decision section which determines the recognition result about said alphabetic character recognized [rejection schedule] based on a semivoiced sound mark alphabetic character and said amendment image.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] Especially this invention relates to an alphabetic character reading system with a function effective in reduction of a misread rate in case recognized alphabetic characters are an alphabetic character with a voice sound symbol, and an alphabetic character with a semivoiced sound mark about a character reader system.
[0002]
[Description of the Prior Art] Drawing 7 is drawing having shown roughly an example of the conventional alphabetic character reading system 10. It is the block diagram having shown the internal configuration of the character reader 13 with which drawing 7 (A) is equipped with in the general drawing of the alphabetic character reading system 10, and especially drawing 7 (B) is equipped in the alphabetic character reading system 10.
[0003] This alphabetic character reading system 10 consists of a workstation 11 (following, WS11) and a character reader 13.
[0004] WS11 is equipped with CRT as keyboard, mouse, and display 11b as input section 11a. This WS11 enables the check of the can reach as a result of character recognition, can display reading image of recognized alphabetic character etc. on display 11b, and according to operator character recognition result by the character reader 13, and correction.
[0005] A character reader 13 is equipped with control-section 13a, image buffer 13b, format buffer 13c, 13d of alphabetic character logging sections, and character recognition section 13e.
[0006] Control-section 13a has the function of means of communications (not shown) with WS11 which is the control means and high order equipment of the character reader 13 whole. Image buffer 13b memorizes the image image of a medium. Format buffer 13c memorizes format information for 13d of alphabetic character logging sections to start an alphabetic character for every character from image buffer 13b. 13d of alphabetic character logging sections starts the character pattern in every character from image buffer 13b according to the above-mentioned format information. Character recognition section 13e recognizes a character pattern by predetermined processing, and outputs a character recognition result etc.
[0007] Next, actuation of this alphabetic character reading system 10 is explained briefly. WS11 passes a character reader 13, the image image of the medium acquired by the approach of arbitration, and the information, i.e., the format information, that the alphabetic character's existence location was defined beforehand. In a character reader 13, control-section 13a stores the above-mentioned image image in image buffer 13b, and stores the above-mentioned format information in format buffer 13c, respectively. 13d of alphabetic character logging sections asks for the character position for reading from this format information, and they start the character pattern in every character from image buffer 13b based on this character position for which it asked. Character recognition section 13e performs character recognition processing to this character pattern, and answers it in a recognition result at WS11. WS11 displays the alphabetic character character corresponding to a recognition result, and a character pattern (original

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image) on display 11b. Recognition result 15x and character-pattern (original image) 15y in case a recognized character string is "BABERU" was shown in drawing 7 (A).
[0008]
[Problem(s) to be Solved by the Invention] By the way, the case of an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark ("henceforth an alphabetic character with a voice sound symbol etc.") has a recognized alphabetic character. A recognized alphabetic character is an alphabetic character with a voice sound symbol etc., and when the voice-sound-symbol part (voice-sound-symbol mark) and the semivoiced sound mark part (semivoiced sound mark mark) touch the body of an alphabetic character by crushing, it is difficult for the conventional alphabetic character reading system for this recognized alphabetic character to specify whether it is ****** with a voice sound symbol. Therefore, when an alphabetic character with a voice sound symbol etc. was a recognized alphabetic character, there was a trouble that a possibility of misreading was high.
[0009] Therefore, alphabetic character reading system implementation which can reduce the misread rate to an alphabetic character with a voice sound symbol etc. compared with the former is desired.
[0010]
[Means for Solving the Problem] Then, according to invention of the 1st of this application, in an alphabetic character reading system equipped with the character recognition section which carries out recognition processing to a recognized alphabetic character, and the display which displays a character recognition result etc., it is characterized by having a voice sound symbol and a semivoiced sound mark alphabetic character detecting element, and an image limb.
[0011] However, a voice sound symbol and a semivoiced sound mark alphabetic character detecting element operate, when the character recognition section emits a rejection signal. the inside of the candidate alphabetic character which was recognition [of the recognized alphabetic character (this is called "alphabetic character recognized / rejection schedule /") which also presupposed ** that this rejection signal is emitted] processing, and was used -- an alphabetic character with a voice sound symbol -- and -- or it detects whether there is any alphabetic character with a semivoiced sound mark. moreover, an image limb -- the above-mentioned voice sound symbol and semivoiced sound mark alphabetic character detecting element -- an alphabetic character with a voice sound symbol -- and -- or when an alphabetic character with a semivoiced sound mark is detected, it operates. ** also expands the original image of the above-mentioned alphabetic character recognized [rejection schedule], and displays it on the above-mentioned display.
[0012] According to the alphabetic character reading system of this 1st invention, when a rejection signal is emitted, the possibility of whether the alphabetic character recognized [rejection schedule] is an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark is judged automatically. And when possible, the original image of this alphabetic character recognized [rejection schedule] is expanded automatically, and it displays on a display. Since it considered as the expansion image, the operator of an alphabetic character reading system tends to check the situation of the circumference parts of the voice-sound-symbol mark of a original image, or a semivoiced sound mark mark. therefore -- ****** since the voice-sound-symbol part (voice-sound-symbol mark) and the semivoiced sound mark part (semivoiced sound mark mark) were crushed by the cause of the above-mentioned rejection by the operator of an alphabetic character reading system looking at this expansion image and it was in contact with the body of an alphabetic character -- etc. -- it can judge. Since ** can also perform correction of seeing this expansion image and inputting the original alphabetic character of the recognized alphabetic character (namely, alphabetic character recognized [rejection schedule]) corresponding to this by the keyboard, it is not necessary to reject the alphabetic character recognized [rejection schedule]. Therefore, reduction of a misread rate in case recognized alphabetic characters are an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark can be aimed at.
[0013] In addition, in this 1st invention, the image image (for example, the image read with the scanner and the image in a database) of the medium which the alphabetic character reading system acquired in a certain form may be used for a original image, and the alphabetic character pattern which the alphabetic

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character logging section cut down is sufficient as it. However, it is desirable to consider as the alphabetic character pattern of the alphabetic character recognized [rejection schedule], considering the simplicity of processing.

[0014] Moreover, according to invention of the 2nd of this application, in an alphabetic character reading system equipped with the character recognition section which carries out recognition processing to a recognized alphabetic character, and the display which displays a character recognition result etc., it is characterized by having a voice sound symbol and a semivoiced sound mark alphabetic character detecting element, and the amendment image creation section.

[0015] However, a voice sound symbol and a semivoiced sound mark alphabetic character detecting element operate, when the character recognition section emits a rejection signal. the inside of the candidate alphabetic character used by recognition processing of the recognized alphabetic character (this is called "alphabetic character recognized [rejection schedule]") which also presupposed ** that this rejection signal is emitted -- an alphabetic character with a voice sound symbol -- and -- or it detects whether there is any alphabetic character with a semivoiced sound mark. moreover, the amendment image creation section -- the above-mentioned voice sound symbol and semivoiced sound mark alphabetic character detecting element -- an alphabetic character with a voice sound symbol -- and -- or when an alphabetic character with a semivoiced sound mark is detected, it operates. From the original image of the above-mentioned alphabetic character recognized [rejection schedule], ** also extracts two or more amendment images based on at least two kinds of binary-ized thresholds, respectively, and displays these amendment image on the above-mentioned display, respectively.

[0016] According to the alphabetic character reading system of this 2nd invention, when a rejection signal is emitted, the possibility of being an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark is automatically judged for the alphabetic character recognized [rejection schedule]. And when possible, two or more amendment images which changed the binary-ized threshold are automatically extracted from the original image of this alphabetic character recognized [rejection schedule], and it displays on a display, respectively. These amendment image is an image from which the image concentration of a voice-sound-symbol part (voice-sound-symbol mark) or a semivoiced sound mark part (semivoiced sound mark mark) and the image concentration of the part between a voice-sound-symbol mark etc. and the body section of an alphabetic character differ. Therefore, in these amendment image, the image whose alphabetic character recognized [rejection schedule] tends to judge [the operator of an alphabetic character reading system] whether they are an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark is included. moreover -- ****** since the voice-sound-symbol part (voice-sound-symbol mark) and the semivoiced sound mark part (semivoiced sound mark mark) were crushed by the cause of the above-mentioned rejection by seeing this amendment image and it was in contact with the body of an alphabetic character -- etc. -- it can judge. Since ** can also perform correction of seeing this amendment image and inputting the original alphabetic character of the recognized alphabetic character (namely, alphabetic character recognized [rejection schedule]) corresponding to this by the keyboard, it is not necessary to reject the alphabetic character recognized [rejection schedule]. Therefore, reduction of a misread rate in case recognized alphabetic characters are an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark can be aimed at.

[0017] In addition, in this 2nd invention, a original image is good to carry out to the image image of the medium which the alphabetic character reading system acquired in a certain form (for example, the image read with the scanner and the image in a database), i.e., the image before the alphabetic character logging section starts. Moreover, in this 2nd invention, a original image is good preferably to consider as the image expressed with the multiple value. Moreover, the threshold set as a different value to a multiple-value image is sufficient as the binary-ized threshold as used in the field of this 2nd invention, and it may be the case of a threshold which distinguishes a white pixel and a black pixel in the lump condition of a black pixel etc. to a binary image. In addition, a original image can be managed also with the binary image instead of a multiple-value image if it is the case of the latter (namely, when making lump condition of a black pixel etc. into a threshold).

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[0018] Moreover, in carrying out this 2nd invention, it is desirable to expand and display an amendment image. If it carries out like this, as for an operator, the neighborhood of the voice-sound-symbol mark of a original image or a semivoiced sound mark mark will become much more legible.
[0019] In carrying out these 1st and 2nd invention moreover, preferably Or it considers as the configuration which also displays a semivoiced sound mark alphabetic character on the above-mentioned display collectively. the voice-sound-symbol alphabetic character in which the above-mentioned voice sound symbol and semivoiced sound mark alphabetic character detecting element detected the above-mentioned image limb or the amendment MEJI creation section -- and -- the voice-sound-symbol alphabetic character in which the alphabetic character reading system was this displayed -- and -- or it is good to consider as the configuration further equipped with the alphabetic character decision section which determines the recognition result about the above-mentioned alphabetic character recognized [rejection schedule] as a semivoiced sound mark alphabetic character based on the above-mentioned expansion image (it is an amendment image in the case of the amendment image creation section).
[0020] According to this desirable configuration, an operator can contrast the image (in the case of the amendment image creation section, it is an amendment image) which are a candidate alphabetic character and a original image and was expanded on the same display. In this candidate alphabetic character, the alphabetic character with the high probability (probability) of the true recognition result of this alphabetic character recognized [rejection schedule] is contained in many cases. Therefore, decision of the recognition result by the operator can be made easier to carry out.
[0021]
[Embodiment of the Invention] Hereafter, with reference to a drawing, the gestalt of operation of the alphabetic character reading system of this invention is explained. However, each drawing used for explanation is roughly shown in extent which can understand these invention. Moreover, in each drawing, about the same constituent, the same number may be attached and shown and the overlapping explanation may be omitted.
[0022] 1. Gestalt drawing 1 of the 1st operation is drawing explaining the alphabetic character reading system 20 of the gestalt of the 1st operation. It is the block diagram in which drawing 1 (A) showed general drawing, and especially drawing 1 (B) showed the internal configuration of a character reader 23.
[0023] The alphabetic character reading system 20 of the gestalt of the 1st operation is a workstation 21 (a personal computer is also included.). Hereafter, it constitutes from WS21 and a character reader 23. Of course, when a character reader 23 is built in with gestalten, such as a computer program, in an external case or WS21 to WS21, any are sufficient as it (namely, when the alphabetic character reading system 20 consists of WS21 the very thing).
[0024] WS21 is equipped with CRT as keyboard, mouse, and display 21b as input section 21a.
[0025] This WS21 can display the reading image of the character recognition result from a character reader 23, and a recognized alphabetic character on display 21b, and enables the check and correction of a character recognition result by the operator.
[0026] Here, the character recognition result displayed on display 21b is a character corresponding to a JIS character code typically, and it is at the time of rejection, the display of the arbitration of a purport, for example, "?" display, which shows rejection. The candidate alphabetic character furthermore treated by this invention as it was similar to some extent to the recognized alphabetic character in recognition processing although it did not consider as a candidate alphabetic character final as a character recognition result of the alphabetic character recognized [rejection schedule] at character recognition section 23e may be used. Although mentioned later for details, generally character recognition section 23e contains the matching section which was shown in drawing 2 (A) to the recognized alphabetic character and which arranges an alphabetic character with a near distance in order like, and mentions a candidate alphabetic character, and the detail discernment section which looks at a pattern in more detail about the candidate alphabetic character which the matching section mentioned, and mentions a final candidate alphabetic character in many cases. Therefore, even if a candidate alphabetic character goes

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up, the detail discernment section may judge it as rejection by a certain reason. It becomes possible to display later a part or all of a candidate alphabetic character that, on the other hand, used in the matching section what is not a final candidate alphabetic character on display 21b as a recognition result of the alphabetic character recognized [rejection schedule] (it mentions later for details). And it is because the operator of an alphabetic character reading system can use such a candidate alphabetic character as a selection candidate for determining a recognition result if such a candidate alphabetic character can be displayed, so it is thought that it is easy to make the decision of the recognition result of the alphabetic character recognized [rejection schedule].

[0027] On the other hand, a reading image may be a original image of a recognized alphabetic character, the image stored in image buffer 23b (it mentions later) may be used for it, or the alphabetic character pattern which 23d of alphabetic character logging sections cut down is sufficient as it.

[0028] A character reader 23 is equipped with control-section 23a, image buffer 23b, format buffer 23c, 23d of alphabetic character logging sections, character recognition section 23e, 23f of matching result candidate preservation sections, 23g of voice sound symbols and semivoiced sound mark alphabetic character detecting elements, 23h of image limbs, and alphabetic character decision section 23i.

[0029] Typically, each [these] constituents 23a-23i are realizable by combining input section 21a and the computer program of CPU, memory, and WS21.

[0030] Control-section 23a with which a character reader 23 is equipped has ****** of means of communications (not shown) with WS21 which is the control means and high order equipment of the character reader 23 whole.

[0031] Moreover, image buffer 23b memorizes the image image of a medium. Moreover, format buffer 23c memorizes format information for 23d of alphabetic character logging sections to start an alphabetic character for every character from image buffer 23b.

[0032] Moreover, 23d of alphabetic character logging sections cuts down the alphabetic character pattern in every character from image buffer 23b according to the above-mentioned format information.

[0033] Moreover, character recognition section 23e processes a character pattern by the arbitrary suitable character recognition technique, and outputs a character recognition result. This character recognition section 23e is good to consider as the configuration which was mentioned above and which is equipped with the matching section and the detail discernment section like.

[0034] Here, a medium means the thing of the arbitration (of course, printing is also included) to which the alphabetic character for alphabetic character reading, the notation, etc. were written. Moreover, the case of the image image which read the image image of a medium in the medium with image readers (scanner etc.), or the image image in the database prepared separately says the thing of arbitration.

[0035] Moreover, 23f of matching result candidate preservation sections is [character recognition] under processing in character recognition section 23e, and they save temporarily the candidate alphabetic character obtained by performing matching with the character pattern of a recognized alphabetic character, and the standard pattern in a recognition dictionary.

[0036] moreover, the inside of the candidate alphabetic character used by recognition processing of the recognized alphabetic character (namely, alphabetic character recognized [rejection schedule]) to which it was presupposed that a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements operate when character-recognition section 23e emits a rejection signal, and this rejection signal is emitted (the gestalt of this operation -- the inside of 23f of matching result candidate preservation sections) -- an alphabetic character with a voice sound symbol -- and -- or it detects whether there is any alphabetic character with a semivoiced sound mark.

[0037] this alphabetic character with a voice sound symbol -- and -- or detection of whether there is any alphabetic character with a semivoiced sound mark can be performed by the JIS character code of the candidate alphabetic character saved for example, in 23f of matching result candidate preservation sections being investigating whether it corresponding to the character code of an alphabetic character with a voice sound symbol, or an alphabetic character with a semivoiced sound mark.

[0038] 23h of moreover, image limbs -- a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements -- the inside of the candidate alphabetic character of the

alphabetic character recognized [rejection schedule] -- an alphabetic character with a voice sound symbol -- and -- or when an alphabetic character with a semivoiced sound mark is detected, in the original image of this alphabetic character recognized [rejection schedule], and this example, an alphabetic character pattern is expanded and it displays on display 21b.
[0039] The magnifying power of the original image by 23h of image limbs is good to set it as the scale factor considered for an operator to be legible beforehand. This set point is good to store in a format buffer. Moreover, the set-up scale factor is good to consider as the configuration which an operator can change into arbitration behind from input section 21of (containing also at time of activity), and WS21 a.
[0040] Moreover, alphabetic character decision section 23i determines the final recognition result of the alphabetic character recognized [rejection schedule]. This alphabetic character decision section 23i is directions by the operator who looked at the original image which was displayed on display 21b, and which the alphabetic character recognized [rejection schedule] expanded, and determines the recognition result of this recognized alphabetic character. For example, an operator looks at the above-mentioned image by which the enlarged display was carried out, and it can do with the configuration of inputting the alphabetic character according to it from a keyboard.
[0041] however, 23h of image limbs and alphabetic character decision section 23i -- it is good also considering each as following configurations.
[0042] With namely, the image to which the original image of the alphabetic character recognized [rejection schedule] was expanded for 23h of image limbs It considers as the configuration which also displays collectively the candidate alphabetic character which a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements detected on display 21b. It is good to consider as the configuration which determines the character recognition result of the alphabetic character recognized [rejection schedule] based on the image which carried out [above-mentioned] expansion of the alphabetic character decision section 23i with the voice sound symbol and the semivoiced sound mark candidate alphabetic character which combined and was displayed on display 21b. In this way, it is because an operator can see to coincidence the voice sound symbol and semivoiced sound mark alphabetic character displayed on display 21b, and the image to which the original image of the alphabetic character recognized [rejection schedule] was expanded if it sets, so it becomes easy to determine the just recognition result of the alphabetic character recognized [rejection schedule]. the alphabetic character with a voice sound symbol in which, as for such alphabetic character decision section 23i of a suitable example, the operator was displayed on the above-mentioned display 21b -- and -- or with an alphabetic character with a semivoiced sound mark 1 which clicked the alphabetic character which compares and wishes for said expanded original image with the mouse, or attached it to the candidate alphabetic character beforehand, and 2 -- it is realizable by the technique of determining an alphabetic character in inputting the number of the alphabetic character which he wishes of the numbers, such as .., by the keyboard etc.
[0043] Next, that actuation is explained in order to deepen an understanding of the alphabetic character reading system 20 of the gestalt of this 1st operation.
[0044] WS21 passes a character reader 23, the reading image acquired by the approach of arbitration, and the information, i.e., the format information, that the alphabetic character's existence location was defined beforehand. In a character reader 23, control-section 23a stores the above-mentioned reading image in image buffer 23b, and stores the above-mentioned format information in format buffer 23c, respectively. 23d of alphabetic character logging sections asks for the character position for reading from this format information, and they start the character pattern in every character from image buffer 23b based on this character position for which it asked. Character recognition section 23e performs character recognition processing, and answers this character pattern in a reading result at WS21. Moreover, 23f of matching result candidate preservation sections saves for example, the JIS character code of a candidate alphabetic character on the candidate alphabetic character and concrete target which character recognition section 23e extracted.
[0045] a recognized alphabetic character "BA", "BE", and "RU" in case the recognized character string of drawing 2 (A) is "BABERU" -- each -- the 1- it is drawing having shown the example which the

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candidate alphabetic character to the 3rd place went up. 23f of matching result candidate preservation sections saves for example, the JIS character code of these candidate alphabetic character.
[0046] When character recognition section 23e mentions a candidate alphabetic character final as a recognition result out of the above-mentioned candidate alphabetic character by predetermined processing, the alphabetic character reading system 20 carries out character recognition processing about the following recognized alphabetic character.
[0047] However, when character recognition section 23e outputs a rejection signal as a recognition result about a recognized alphabetic character, a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements start actuation. And as compared with the code table a voice sound symbol and for for example, alphabetic characters with a semivoiced sound mark, it detects whether a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements have an alphabetic character with a voice sound symbol, and an alphabetic character with a semivoiced sound mark in the candidate alphabetic character saved at 23f of matching candidate preservation sections about this alphabetic character recognized [rejection schedule]. An example of this code table was shown in drawing 2 (B).
[0048] When an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark are detected, 23h of image limbs expands and displays on display 21b the original image (character pattern obtained by alphabetic character logging in this example) of this alphabetic character recognized [rejection schedule]. Drawing 3 shows the example of a display. That is, since the recognized alphabetic character "BE" in a recognized character string "BABERU" turned into an alphabetic character recognized [rejection schedule], the example as which the original image of that was expanded and displayed has been shown. In addition, about the recognized alphabetic character which was not a rejection signal, it can do with the display of arbitration. For example, it is displaying with a original image etc. Drawing 3 is the example. Moreover, in the example of this drawing 3 , it is a recognized alphabetic character and is the example which combined the character of that alphabetic character with display 21b, showed it about that from which the final recognition result was obtained, and showed the display "?" of the purport which shows rejection as a recognition result of the alphabetic character recognized [rejection schedule]. however, the candidate alphabetic character which was explained previously and which was used as a recognition result of the alphabetic character recognized [rejection schedule] like in the middle of character recognition -- it is -- an alphabetic character with a voice sound symbol -- and -- or you may make it display the candidate alphabetic character which is an alphabetic character with a semivoiced sound mark
[0049] Since the enlarged display of the original image of a recognized alphabetic character "BE" was carried out in the case of the example of this drawing 3 , the operator of an alphabetic character reading system turns out that this is an alphabetic character recognized [rejection schedule]. And this image by which the enlarged display was carried out is seen, and the recognition result of this recognized alphabetic character can be determined. For example, a recognition result can be determined by the approach of inputting the alphabetic character corresponding to this image from a keyboard etc.
[0050] According to the character reader 20 of the gestalt of this 1st operation, when the recognized alphabetic character of a rejection schedule has possibility, such as an alphabetic character with a voice sound symbol, the enlarged display of that original image is automatically carried out to a display. Therefore, an operator can perform suitable processing, for example. For example, it can process that an operator inputs a right character code etc. Therefore, since it is not necessary to reject, misreading resulting from alphabetic character crushing of an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark etc. can be reduced.
[0051] moreover, the alphabetic character with a voice sound symbol detected like the suitable example the image to which 23h of image limbs expanded the original image of a recognized alphabetic character, and out of the candidate alphabetic character -- and -- or a decision activity and correction of an operator can be made easy to perform in a configuration of that display an alphabetic character with a semivoiced sound mark on display 21b collectively, and alphabetic character decision section 23i determines a recognition result based on these.

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[0052] 2. Gestalt drawing 4 of the 2nd operation is the explanatory view of the alphabetic character reading system 30 of the gestalt of the 2nd operation. It is the block diagram in which drawing 4 (A) showed general drawing, and especially drawing 4 (B) showed the internal configuration of a character reader 31.
[0053] The alphabetic character reading system 30 of the gestalt of this 2nd operation consists of WS21 and a character reader 31.
[0054] Since WS21 is made with the thing of the same configuration as the gestalt of the 1st operation explained, it omits the explanation.
[0055] Moreover, a character reader 31 is equipped with control-section 23a, image buffer 23b, format buffer 23c, 23d of alphabetic character logging sections, character recognition section 23e, 23f of matching result candidate preservation sections, and 23g of voice sound symbols and semivoiced sound mark alphabetic character detecting elements like the gestalt of the 1st operation.
[0056] Furthermore, the character reader 31 of the alphabetic character reading system 30 of the gestalt of this 2nd operation is equipped with amendment MEJI creation section 31a and alphabetic character decision section 31b as a description of the gestalt of the 2nd operation.
[0057] amendment image creation section 31a -- a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements -- an alphabetic character with a voice sound symbol -- and -- or when an alphabetic character with a semivoiced sound mark is detected, it operates. And based on at least two kinds of binary-ized thresholds, two or more amendment images are extracted from the original image of a current recognized alphabetic character (alphabetic character recognized [rejection schedule]), and the reading image stored in image buffer 23b in this case, respectively. ** also displays these amendment image on display 21b, respectively.
[0058] Here, a binary-ized threshold is a concentration threshold at the time of extracting an image from image buffer 23b. It is a concentration threshold when extracting the pixel more than a certain concentration from the alphabetic character field on image buffer 23b specifically decided by format information stored in format buffer 23c as an image of a recognized alphabetic character. The image for every value of the can be extracted by changing a binary-ized threshold (for details, it explains in the case of explanation of operation.). This binary-ized threshold is good to carry out a multi-statement so that the value which can create an image legible for the operator of an alphabetic character reading system may be included. These binary-ized threshold is that an operator inputs from a keyboard etc. whether it stores for example, in format buffer 23c beforehand timely etc., and is ready. Moreover, a binary-ized threshold is good to consider as the configuration which can change a value by (it contains also at the time of an activity), and the operator behind.
[0059] This amendment image creation section 31a is good more preferably to consider as the configuration which expands each created image and is displayed on display 21b. It is because an operator will become legible about the image for every binary-ized threshold if it carries out like this.
[0060] When considering as the thing of a configuration of carrying out the enlarged display of the image which created amendment image creation section 31a, the magnifying power of a original image is good to set it as the scale factor considered for an operator to be legible beforehand. This set point is good to store for example, in a format buffer. Moreover, the set-up scale factor is good to consider as the configuration which an operator can change into arbitration behind from input section 21of (containing also at time of activity), and WS21 a.
[0061] Moreover, alphabetic character decision section 31b chooses the final recognition result of the alphabetic character recognized [rejection schedule]. This alphabetic character decision section 31b is directions of the operator who looked at the above-mentioned amendment image displayed on display 21b, and determines the recognition result of this recognized alphabetic character. For example, an operator looks at the above-mentioned amendment image, and can do it with the configuration which inputs the alphabetic character according to it from a keyboard.
[0062] however, amendment image creation section 31a and alphabetic character decision section 31b -- it is good also considering each as following configurations.
[0063] That is, it considers as the configuration which also displays collectively the candidate alphabetic

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character which a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements detected on display 21b with the amendment image which changed the binary-ized threshold and extracted amendment image creation section 31a from the original image of the alphabetic character recognized [rejection schedule]. And it is good to consider as the configuration which determines the character recognition result of the alphabetic character recognized [rejection schedule] based on the voice sound symbol and the semivoiced sound mark candidate alphabetic character, and the above-mentioned amendment image which combined alphabetic character decision section 31b with display 21b, and were displayed. In this way, it is because an operator can see to coincidence the voice sound symbol and semivoiced sound mark alphabetic character displayed on display 21b, and the amendment image (what was expanded is included) of the alphabetic character recognized [rejection schedule] if it sets, so it becomes easy to determine the just recognition result of the alphabetic character recognized [rejection schedule].

[0064] Next, that actuation is explained in order to deepen an understanding of the alphabetic character reading system 30 of the gestalt of this 2nd operation.

[0065] WS21 passes a character reader 31, the reading image acquired by the approach of arbitration, and the information, i.e., the format information, that the alphabetic character's existence location was defined beforehand. In a character reader 31, control-section 23a stores the above-mentioned reading image in image buffer 23b, and stores the above-mentioned format information in format buffer 23c, respectively. 23d of alphabetic character logging sections asks for the character position for reading from this format information, and they start the character pattern in every character from image buffer 23b based on this character position for which it asked. Character recognition section 23e performs character recognition processing, and answers this character pattern in a reading result at WS21. Moreover, 23f of matching result candidate preservation sections saves for example, the JIS character code of a candidate alphabetic character on the candidate alphabetic character and concrete target which character recognition section 23e extracted.

[0066] When character recognition section 23e mentions a candidate alphabetic character final as a recognition result out of the above-mentioned candidate alphabetic character by predetermined processing, the alphabetic character reading system 30 carries out character recognition processing about the following recognized alphabetic character.

[0067] However, when character recognition section 23e outputs a rejection signal as a recognition result about a recognized alphabetic character, a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements start actuation. And as compared with the code table a voice sound symbol and for for example, alphabetic characters with a semivoiced sound mark, it detects whether a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements have an alphabetic character with a voice sound symbol, and an alphabetic character with a semivoiced sound mark in the candidate alphabetic character saved at 23f of matching result candidate preservation sections about this alphabetic character recognized [rejection schedule].

[0068] When an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark are detected, amendment image creation section 31a extracts an amendment image from the original image (image saved in this example at image buffer 23b) of this alphabetic character recognized [rejection schedule] using at least two kinds of binary-ized thresholds, respectively. This binary-ized threshold is good to store in format buffer 23c beforehand, for example, and to consider as the configuration which amendment image creation section 31a reads at the time of the need from there. In addition, it is still better to consider as the configuration which can change this binary-ized threshold by the operator.

[0069] Drawing 5 (A) and (B) are drawings explaining extract processing of an amendment image. making a binary-ized threshold into the 1st - the 3rd value X1, X2, and X3, 80, 85, and 90, for example, three kinds, scanning image buffer 23b, respectively (namely, 3 times -- scanning), and extracting three kinds of amendment images is shown in drawing 5 (A). moreover, the 1- from which drawing 5 (B) comes out, respectively, and is extracted by the case where the alphabetic character recognized [rejection schedule] is "BA" when a binary-ized threshold is made into the 1st - the 3rd value -- the 3rd

amendment image 33a-33c is shown.
[0070] In this way, the extracted amendment images 33a-33c are displayed on display 21b, respectively. In the case of this example, ** is also expanded and displayed. ** is also combined with a recognition result and is displayed. Drawing 6 is drawing having shown the example of a display. Since only the alphabetic character of "BA" was an alphabetic character recognized [rejection schedule], it is shown as an amendment image which is expanded about the alphabetic character and is different. The display "?" of the purport ** also indicates rejection to be as a recognition result of the alphabetic character of "BA" is displayed. however, the alphabetic character with a voice sound symbol detected as this recognition result by the voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements -- and -- or an alphabetic character with a semivoiced sound mark may be displayed.
[0071] Since the images of a recognized alphabetic character "BA" are the amendment images 33a-33c in the case of the example of this drawing 6 , the operator of an alphabetic character reading system turns out that this alphabetic character is an alphabetic character recognized [rejection schedule]. And these amendment image is seen and the recognition result of this recognized alphabetic character can be determined. For example, a recognition result can be determined by the approach of inputting the alphabetic character corresponding to this image from a keyboard etc.
[0072] According to the character reader 30 of the gestalt of this 2nd operation, when the recognized alphabetic character of a rejection schedule has possibility, such as an alphabetic character with a voice sound symbol, the amendment image by binary-ized threshold which is different from the original image of that alphabetic character is extracted automatically, and they are displayed on a display. Therefore, an operator looks at the legible (it is the optimal) amendment image in these amendment image, and can perform suitable processing, for example. For example, it can process that an operator inputs a right character code etc. Therefore, since it is not necessary to reject, misreading resulting from alphabetic character crushing of an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark etc. can be reduced.
[0073] moreover, the alphabetic character with a voice sound symbol in which amendment image creation section 31a was detected the amendment image of a recognized alphabetic character, and out of the candidate alphabetic character like the suitable example -- and -- or a decision activity and correction of an operator can be made easy to perform in a configuration of that display an alphabetic character with a semivoiced sound mark on display 21b collectively, and alphabetic character decision section 31b determines a recognition result based on these.
[0074] In ****, the gestalt of operation of the alphabetic character reading system of this invention was explained. However, these invention is not limited to the gestalt of above-mentioned operation at all, and can make many deformation or modification.
[0075] For example, with the gestalt of the above-mentioned 1st and the 2nd operation, in order that the alphabetic character logging section might start an alphabetic character from an image buffer, the example which uses format information was explained. However, the alphabetic character logging technique is not restricted to this example, but is good by arbitrary suitable approaches. For example, you may be the technique the alphabetic character logging section itself scans an image buffer, it detects the boundary in every character, and starts an alphabetic character based on it.
[0076]
[Effect of the Invention] According to the alphabetic character reading system of invention of the 1st of this application, it judges whether the recognized alphabetic character of a rejection schedule has possibility, such as an alphabetic character with a voice sound symbol, and when that is right, the original image of this recognized alphabetic character is expanded, and it displays on a display, so that clearly from the explanation mentioned above. Moreover, according to the alphabetic character reading system of invention of the 2nd of this application, it judges whether the recognized alphabetic character of a rejection schedule has possibility, such as an alphabetic character with a voice sound symbol, and when that is right, a binary-ized threshold which is different from the original image of this recognized alphabetic character extracts two or more amendment images, and it is displayed on a display. Therefore, by this display, while being able to demand cautions of the purport which is rejection

resulting from an alphabetic character with a voice sound symbol etc. from the operator of an alphabetic character reading system, an operator looks at this display and can correct the recognition result of the recognized alphabetic character of a rejection schedule. Therefore, since the recognized alphabetic character of a rejection schedule is relievable, misreading resulting from alphabetic character crushing of an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark etc. can be reduced.

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TECHNICAL FIELD

[Field of the Invention] Especially this invention relates to an alphabetic character reading system with a function effective in reduction of a misread rate in case recognized alphabetic characters are an alphabetic character with a voice sound symbol, and an alphabetic character with a semivoiced sound mark about a character reader system.

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PRIOR ART

[Description of the Prior Art] Drawing 7 is drawing having shown roughly an example of the conventional alphabetic character reading system 10. It is the block diagram having shown the internal configuration of the character reader 13 with which drawing 7 (A) is equipped with in the general drawing of the alphabetic character reading system 10, and especially drawing 7 (B) is equipped in the alphabetic character reading system 10.
[0003] This alphabetic character reading system 10 consists of a workstation 11 (following, WS11) and a character reader 13.
[0004] WS11 is equipped with CRT as keyboard, mouse, and display 11b as input section 11a. This WS11 enables the check of the can reach as a result of character recognition, can display reading image of recognized alphabetic character etc. on display 11b, and according to operator character recognition result by the character reader 13, and correction.
[0005] A character reader 13 is equipped with control-section 13a, image buffer 13b, format buffer 13c, 13d of alphabetic character logging sections, and character recognition section 13e.
[0006] Control-section 13a has the function of means of communications (not shown) with WS11 which is the control means and high order equipment of the character reader 13 whole. Image buffer 13b memorizes the image image of a medium. Format buffer 13c memorizes format information for 13d of alphabetic character logging sections to start an alphabetic character for every character from image buffer 13b. 13d of alphabetic character logging sections starts the character pattern in every character from image buffer 13b according to the above-mentioned format information. Character recognition section 13e recognizes a character pattern by predetermined processing, and outputs a character recognition result etc.
[0007] Next, actuation of this alphabetic character reading system 10 is explained briefly. WS11 passes a character reader 13, the image image of the medium acquired by the approach of arbitration, and the information, i.e., the format information, that the alphabetic character's existence location was defined beforehand. In a character reader 13, control-section 13a stores the above-mentioned image image in image buffer 13b, and stores the above-mentioned format information in format buffer 13c, respectively. 13d of alphabetic character logging sections asks for the character position for reading from this format information, and they start the character pattern in every character from image buffer 13b based on this character position for which it asked. Character recognition section 13e performs character recognition processing to this character pattern, and answers it in a recognition result at WS11. WS11 displays the alphabetic character character corresponding to a recognition result, and a character pattern (original image) on display 11b. Recognition result 15x and character-pattern (original image) 15y in case a recognized character string is "BABERU" was shown in drawing 7 (A).

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EFFECT OF THE INVENTION

[Effect of the Invention] According to the alphabetic character reading system of invention of the 1st of this application, it judges whether the recognized alphabetic character of a rejection schedule has possibility, such as an alphabetic character with a voice sound symbol, and when that is right, the original image of this recognized alphabetic character is expanded, and it displays on a display, so that clearly from the explanation mentioned above. Moreover, according to the alphabetic character reading system of invention of the 2nd of this application, it judges whether the recognized alphabetic character of a rejection schedule has possibility, such as an alphabetic character with a voice sound symbol, and when that is right, a binary-ized threshold which is different from the original image of this recognized alphabetic character extracts two or more amendment images, and it is displayed on a display. Therefore, by this display, while being able to demand cautions of the purport which is rejection resulting from an alphabetic character with a voice sound symbol etc. from the operator of an alphabetic character reading system, an operator looks at this display and can correct the recognition result of the recognized alphabetic character of a rejection schedule. Therefore, since the recognized alphabetic character of a rejection schedule is relievable, misreading resulting from alphabetic character crushing of an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark etc. can be reduced.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] By the way, an alphabetic character with voice sound symbol and alphabetic character ("henceforth alphabetic character with voice sound symbol etc.") case with a semivoiced sound mark has a recognized alphabetic character. A recognized alphabetic character is an alphabetic character with a voice sound symbol etc., and when the voice-sound-symbol part (voice-sound-symbol mark) and the semivoiced sound mark part (semivoiced sound mark mark) touch the body of an alphabetic character by crushing, it is difficult for the conventional alphabetic character reading system for this recognized alphabetic character to specify whether it is ****** with a voice sound symbol. Therefore, when an alphabetic character with a voice sound symbol etc. was a recognized alphabetic character, there was a trouble that a possibility of misreading was high.
[0009] Therefore, alphabetic character reading system implementation which can reduce the misread rate to an alphabetic character with a voice sound symbol etc. compared with the former is desired.

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MEANS

[Means for Solving the Problem] Then, according to invention of the 1st of this application, in an alphabetic character reading system equipped with the character recognition section which carries out recognition processing to a recognized alphabetic character, and the display which displays a character recognition result etc., it is characterized by having a voice sound symbol and a semivoiced sound mark alphabetic character detecting element, and an image limb.
[0011] However, a voice sound symbol and a semivoiced sound mark alphabetic character detecting element operate, when the character recognition section emits a rejection signal. the inside of the candidate alphabetic character which was recognition [of the recognized alphabetic character (this is called "alphabetic character recognized / rejection schedule /") which also presupposed ** that this rejection signal is emitted] processing, and was used -- an alphabetic character with a voice sound symbol -- and -- or it detects whether there is any alphabetic character with a semivoiced sound mark. moreover, an image limb -- the above-mentioned voice sound symbol and semivoiced sound mark alphabetic character detecting element -- an alphabetic character with a voice sound symbol -- and -- or when an alphabetic character with a semivoiced sound mark is detected, it operates. ** also expands the original image of the above-mentioned alphabetic character recognized [rejection schedule], and displays it on the above-mentioned display.
[0012] According to the alphabetic character reading system of this 1st invention, when a rejection signal is emitted, the possibility of whether the alphabetic character recognized [rejection schedule] is an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark is judged automatically. And when possible, the original image of this alphabetic character recognized [rejection schedule] is expanded automatically, and it displays on a display. Since it considered as the expansion image, the operator of an alphabetic character reading system tends to check the situation of the circumference parts of the voice-sound-symbol mark of a original image, or a semivoiced sound mark mark. therefore -- ****** since the voice-sound-symbol part (voice-sound-symbol mark) and the semivoiced sound mark part (semivoiced sound mark mark) were crushed by the cause of the above-mentioned rejection by the operator of an alphabetic character reading system looking at this expansion image and it was in contact with the body of an alphabetic character -- etc. -- it can judge. Since ** can also perform correction of seeing this expansion image and inputting the original alphabetic character of the recognized alphabetic character (namely, alphabetic character recognized [rejection schedule]) corresponding to this by the keyboard, it is not necessary to reject the alphabetic character recognized [rejection schedule]. Therefore, reduction of a misread rate in case recognized alphabetic characters are an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark can be aimed at.
[0013] In addition, in this 1st invention, the image image (for example, the image read with the scanner and the image in a database) of the medium which the alphabetic character reading system acquired in a certain form may be used for a original image, and the alphabetic character pattern which the alphabetic character logging section cut down is sufficient as it. However, it is desirable to consider as the alphabetic character pattern of the alphabetic character recognized [rejection schedule], considering the

simplicity of processing.
[0014] Moreover, according to invention of the 2nd of this application, in an alphabetic character reading system equipped with the character recognition section which carries out recognition processing to a recognized alphabetic character, and the display which displays a character recognition result etc., it is characterized by having a voice sound symbol and a semivoiced sound mark alphabetic character detecting element, and the amendment image creation section.
[0015] However, a voice sound symbol and a semivoiced sound mark alphabetic character detecting element operate, when the character recognition section emits a rejection signal. the inside of the candidate alphabetic character used by recognition processing of the recognized alphabetic character (this is called "alphabetic character recognized [rejection schedule]") which also presupposed ** that this rejection signal is emitted -- an alphabetic character with a voice sound symbol -- and -- or it detects whether there is any alphabetic character with a semivoiced sound mark. moreover, the amendment image creation section -- the above-mentioned voice sound symbol and semivoiced sound mark alphabetic character detecting element -- an alphabetic character with a voice sound symbol -- and -- or when an alphabetic character with a semivoiced sound mark is detected, it operates. From the original image of the above-mentioned alphabetic character recognized [rejection schedule], ** also extracts two or more amendment images based on at least two kinds of binary-ized thresholds, respectively, and displays these amendment image on the above-mentioned display, respectively.
[0016] According to the alphabetic character reading system of this 2nd invention, when a rejection signal is emitted, the possibility of being an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark is automatically judged for the alphabetic character recognized [rejection schedule]. And when possible, two or more amendment images which changed the binary-ized threshold are automatically extracted from the original image of this alphabetic character recognized [rejection schedule], and it displays on a display, respectively. These amendment image is an image from which the image concentration of a voice-sound-symbol part (voice-sound-symbol mark) or a semivoiced sound mark part (semivoiced sound mark mark) and the image concentration of the part between a voice-sound-symbol mark etc. and the body section of an alphabetic character differ. Therefore, in these amendment image, the image whose alphabetic character recognized [rejection schedule] tends to judge [the operator of an alphabetic character reading system] whether they are an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark is included. moreover -- ****** since the voice-sound-symbol part (voice-sound-symbol mark) and the semivoiced sound mark part (semivoiced sound mark mark) were crushed by the cause of the above-mentioned rejection by seeing this amendment image and it was in contact with the body of an alphabetic character -- etc. -- it can judge. Since ** can also perform correction of seeing this amendment image and inputting the original alphabetic character of the recognized alphabetic character (namely, alphabetic character recognized [rejection schedule]) corresponding to this by the keyboard, it is not necessary to reject the alphabetic character recognized [rejection schedule]. Therefore, reduction of a misread rate in case recognized alphabetic characters are an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark can be aimed at.
[0017] In addition, in this 2nd invention, a original image is good to carry out to the image image of the medium which the alphabetic character reading system acquired in a certain form (for example, the image read with the scanner and the image in a database), i.e., the image before the alphabetic character logging section starts. Moreover, in this 2nd invention, a original image is good preferably to consider as the image expressed with the multiple value. Moreover, the threshold set as a different value to a multiple-value image is sufficient as the binary-ized threshold as used in the field of this 2nd invention, and it may be the case of a threshold which distinguishes a white pixel and a black pixel in the lump condition of a black pixel etc. to a binary image. In addition, a original image can be managed also with the binary image instead of a multiple-value image if it is the case of the latter (namely, when making lump condition of a black pixel etc. into a threshold).
[0018] Moreover, in carrying out this 2nd invention, it is desirable to expand and display an amendment image. If it carries out like this, as for an operator, the neighborhood of the voice-sound-symbol mark of

a original image or a semivoiced sound mark mark will become much more legible.
[0019] In carrying out these 1st and 2nd invention moreover, preferably Or it considers as the configuration which also displays a semivoiced sound mark alphabetic character on the above-mentioned display collectively. the voice-sound-symbol alphabetic character in which the above-mentioned voice sound symbol and semivoiced sound mark alphabetic character detecting element detected the above-mentioned image limb or the amendment MEJI creation section -- and -- the voice-sound-symbol alphabetic character in which the alphabetic character reading system was this displayed -- and -- or it is good to consider as the configuration further equipped with the alphabetic character decision section which determines the recognition result about the above-mentioned alphabetic character recognized [rejection schedule] as a semivoiced sound mark alphabetic character based on the above-mentioned expansion image (it is an amendment image in the case of the amendment image creation section).
[0020] According to this desirable configuration, an operator can contrast the image (in the case of the amendment image creation section, it is an amendment image) which are a candidate alphabetic character and a original image and was expanded on the same display. In this candidate alphabetic character, the alphabetic character with the high probability (probability) of the true recognition result of this alphabetic character recognized [rejection schedule] is contained in many cases. Therefore, decision of the recognition result by the operator can be made easier to carry out.
[0021]
[Embodiment of the Invention] Hereafter, with reference to a drawing, the gestalt of operation of the alphabetic character reading system of this invention is explained. However, each drawing used for explanation is roughly shown in extent which can understand these invention. Moreover, in each drawing, about the same constituent, the same number may be attached and shown and the overlapping explanation may be omitted.
[0022] 1. Gestalt drawing 1 of the 1st operation is drawing explaining the alphabetic character reading system 20 of the gestalt of the 1st operation. It is the block diagram in which drawing 1 (A) showed general drawing, and especially drawing 1 (B) showed the internal configuration of a character reader 23.
[0023] The alphabetic character reading system 20 of the gestalt of the 1st operation is a workstation 21 (a personal computer is also included.). Hereafter, it constitutes from WS21 and a character reader 23. Of course, when a character reader 23 is built in with gestalten, such as a computer program, in an external case or WS21 to WS21, any are sufficient as it (namely, when the alphabetic character reading system 20 consists of WS21 the very thing).
[0024] WS21 is equipped with CRT as keyboard, mouse, and display 21b as input section 21a.
[0025] This WS21 can display the reading image of the character recognition result from a character reader 23, and a recognized alphabetic character on display 21b, and enables the check and correction of a character recognition result by the operator.
[0026] Here, the character recognition result displayed on display 21b is a character corresponding to a JIS character code typically, and it is at the time of rejection, the display of the arbitration of a purport, for example, "?" display, which shows rejection. The candidate alphabetic character furthermore treated by this invention as it was similar to some extent to the recognized alphabetic character in recognition processing although it did not consider as a candidate alphabetic character final as a character recognition result of the alphabetic character recognized [rejection schedule] at character recognition section 23e may be used. Although mentioned later for details, generally character recognition section 23e contains the matching section which was shown in drawing 2 (A) to the recognized alphabetic character and which arranges an alphabetic character with a near distance in order like, and mentions a candidate alphabetic character, and the detail discernment section which looks at a pattern in more detail about the candidate alphabetic character which the matching section mentioned, and mentions a final candidate alphabetic character in many cases. Therefore, even if a candidate alphabetic character goes up, the detail discernment section may judge it as rejection by a certain reason. It becomes possible to display later a part or all of a candidate alphabetic character that, on the other hand, used in the matching

section what is not a final candidate alphabetic character on display 21b as a recognition result of the alphabetic character recognized [rejection schedule] (it mentions later for details). And it is because the operator of an alphabetic character reading system can use such a candidate alphabetic character as a selection candidate for determining a recognition result if such a candidate alphabetic character can be displayed, so it is thought that it is easy to make the decision of the recognition result of the alphabetic character recognized [rejection schedule].
[0027] On the other hand, a reading image may be a original image of a recognized alphabetic character, the image stored in image buffer 23b (it mentions later) may be used for it, or the alphabetic character pattern which 23d of alphabetic character logging sections cut down is sufficient as it.
[0028] A character reader 23 is equipped with control-section 23a, image buffer 23b, format buffer 23c, 23d of alphabetic character logging sections, character recognition section 23e, 23f of matching result candidate preservation sections, 23g of voice sound symbols and semivoiced sound mark alphabetic character detecting elements, 23h of image limbs, and alphabetic character decision section 23i.
[0029] Typically, each [these] constituents 23a-23i are realizable by combining input section 21a and the computer program of CPU, memory, and WS21.
[0030] Control-section 23a with which a character reader 23 is equipped has ****** of means of communications (not shown) with WS21 which is the control means and high order equipment of the character reader 23 whole.
[0031] Moreover, image buffer 23b memorizes the image image of a medium. Moreover, format buffer 23c memorizes format information for 23d of alphabetic character logging sections to start an alphabetic character for every character from image buffer 23b.
[0032] Moreover, 23d of alphabetic character logging sections cuts down the alphabetic character pattern in every character from image buffer 23b according to the above-mentioned format information.
[0033] Moreover, character recognition section 23e processes a character pattern by the arbitrary suitable character recognition technique, and outputs a character recognition result. This character recognition section 23e is good to consider as the configuration which was mentioned above and which is equipped with the matching section and the detail discernment section like.
[0034] Here, a medium means the thing of the arbitration (of course, printing is also included) to which the alphabetic character for alphabetic character reading, the notation, etc. were written. Moreover, the case of the image image which read the image image of a medium in the medium with image readers (scanner etc.), or the image image in the database prepared separately says the thing of arbitration.
[0035] Moreover, 23f of matching result candidate preservation sections is [character recognition] under processing in character recognition section 23e, and they save temporarily the candidate alphabetic character obtained by performing matching with the character pattern of a recognized alphabetic character, and the standard pattern in a recognition dictionary.
[0036] moreover, the inside of the candidate alphabetic character used by recognition processing of the recognized alphabetic character (namely, alphabetic character recognized [rejection schedule]) to which it was presupposed that a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements operate when character-recognition section 23e emits a rejection signal, and this rejection signal is emitted (the gestalt of this operation -- the inside of 23f of matching result candidate preservation sections) -- an alphabetic character with a voice sound symbol -- and -- or it detects whether there is any alphabetic character with a semivoiced sound mark.
[0037] this alphabetic character with a voice sound symbol -- and -- or detection of whether there is any alphabetic character with a semivoiced sound mark can be performed by the JIS character code of the candidate alphabetic character saved for example, in 23f of matching result candidate preservation sections being investigating whether it corresponding to the character code of an alphabetic character with a voice sound symbol, or an alphabetic character with a semivoiced sound mark.
[0038] 23h of moreover, image limbs -- a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements -- the inside of the candidate alphabetic character of the alphabetic character recognized [rejection schedule] -- an alphabetic character with a voice sound symbol -- and -- or when an alphabetic character with a semivoiced sound mark is detected, in the

original image of this alphabetic character recognized [rejection schedule], and this example, an alphabetic character pattern is expanded and it displays on display 21b.
[0039] The magnifying power of the original image by 23h of image limbs is good to set it as the scale factor considered for an operator to be legible beforehand. This set point is good to store in a format buffer. Moreover, the set-up scale factor is good to consider as the configuration which an operator can change into arbitration behind from input section 21of (containing also at time of activity), and WS21 a.
[0040] Moreover, alphabetic character decision section 23i determines the final recognition result of the alphabetic character recognized [rejection schedule]. This alphabetic character decision section 23i is directions by the operator who looked at the original image which was displayed on display 21b, and which the alphabetic character recognized [rejection schedule] expanded, and determines the recognition result of this recognized alphabetic character. For example, an operator looks at the above-mentioned image by which the enlarged display was carried out, and it can do with the configuration of inputting the alphabetic character according to it from a keyboard.
[0041] however, 23h of image limbs and alphabetic character decision section 23i -- it is good also considering each as following configurations.
[0042] With namely, the image to which the original image of the alphabetic character recognized [rejection schedule] was expanded for 23h of image limbs It considers as the configuration which also displays collectively the candidate alphabetic character which a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements detected on display 21b. It is good to consider as the configuration which determines the character recognition result of the alphabetic character recognized [rejection schedule] based on the image which carried out [above-mentioned] expansion of the alphabetic character decision section 23i with the voice sound symbol and the semivoiced sound mark candidate alphabetic character which combined and was displayed on display 21b. In this way, it is because an operator can see to coincidence the voice sound symbol and semivoiced sound mark alphabetic character displayed on display 21b, and the image to which the original image of the alphabetic character recognized [rejection schedule] was expanded if it sets, so it becomes easy to determine the just recognition result of the alphabetic character recognized [rejection schedule]. the alphabetic character with a voice sound symbol in which, as for such alphabetic character decision section 23i of a suitable example, the operator was displayed on the above-mentioned display 21b -- and -- or with an alphabetic character with a semivoiced sound mark 1 which clicked the alphabetic character which compares and wishes for said expanded original image with the mouse, or attached it to the candidate alphabetic character beforehand, and 2 -- it is realizable by the technique of determining an alphabetic character in inputting the number of the alphabetic character which he wishes of the numbers, such as .., by the keyboard etc.
[0043] Next, that actuation is explained in order to deepen an understanding of the alphabetic character reading system 20 of the gestalt of this 1st operation.
[0044] WS21 passes a character reader 23, the reading image acquired by the approach of arbitration, and the information, i.e., the format information, that the alphabetic character's existence location was defined beforehand. In a character reader 23, control-section 23a stores the above-mentioned reading image in image buffer 23b, and stores the above-mentioned format information in format buffer 23c, respectively. 23d of alphabetic character logging sections asks for the character position for reading from this format information, and they start the character pattern in every character from image buffer 23b based on this character position for which it asked. Character recognition section 23e performs character recognition processing, and answers this character pattern in a reading result at WS21. Moreover, 23f of matching result candidate preservation sections saves for example, the JIS character code of a candidate alphabetic character on the candidate alphabetic character and concrete target which character recognition section 23e extracted.
[0045] a recognized alphabetic character "BA", "BE", and "RU" in case the recognized character string of drawing 2 (A) is "BABERU" -- each -- the 1- it is drawing having shown the example which the candidate alphabetic character to the 3rd place went up. 23f of matching result candidate preservation sections saves for example, the JIS character code of these candidate alphabetic character.

h g cg b eb cg e e

[0046] When character recognition section 23e mentions a candidate alphabetic character final as a recognition result out of the above-mentioned candidate alphabetic character by predetermined processing, the alphabetic character reading system 20 carries out character recognition processing about the following recognized alphabetic character.
[0047] However, when character recognition section 23e outputs a rejection signal as a recognition result about a recognized alphabetic character, a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements start actuation. And as compared with the code table a voice sound symbol and for for example, alphabetic characters with a semivoiced sound mark, it detects whether a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements have an alphabetic character with a voice sound symbol, and an alphabetic character with a semivoiced sound mark in the candidate alphabetic character saved at 23f of matching candidate preservation sections about this alphabetic character recognized [rejection schedule]. An example of this code table was shown in drawing 2 (B).
[0048] When an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark are detected, 23h of image limbs expands and displays on display 21b the original image (character pattern obtained by alphabetic character logging in this example) of this alphabetic character recognized [rejection schedule]. Drawing 3 shows the example of a display. That is, since the recognized alphabetic character "BE" in a recognized character string "BABERU" turned into an alphabetic character recognized [rejection schedule], the example as which the original image of that was expanded and displayed has been shown. In addition, about the recognized alphabetic character which was not a rejection signal, it can do with the display of arbitration. For example, it is displaying with a original image etc. Drawing 3 is the example. Moreover, in the example of this drawing 3 , it is a recognized alphabetic character and is the example which combined the character of that alphabetic character with display 21b, showed it about that from which the final recognition result was obtained, and showed the display "?" of the purport which shows rejection as a recognition result of the alphabetic character recognized [rejection schedule]. however, the candidate alphabetic character which was explained previously and which was used as a recognition result of the alphabetic character recognized [rejection schedule] like in the middle of character recognition -- it is -- an alphabetic character with a voice sound symbol -- and -- or you may make it display the candidate alphabetic character which is an alphabetic character with a semivoiced sound mark
[0049] Since the enlarged display of the original image of a recognized alphabetic character "BE" was carried out in the case of the example of this drawing 3 , the operator of an alphabetic character reading system turns out that this is an alphabetic character recognized [rejection schedule]. And this image by which the enlarged display was carried out is seen, and the recognition result of this recognized alphabetic character can be determined. For example, a recognition result can be determined by the approach of inputting the alphabetic character corresponding to this image from a keyboard etc.
[0050] According to the character reader 20 of the gestalt of this 1st operation, when the recognized alphabetic character of a rejection schedule has possibility, such as an alphabetic character with a voice sound symbol, the enlarged display of that original image is automatically carried out to a display. Therefore, an operator can perform suitable processing, for example. For example, it can process that an operator inputs a right character code etc. Therefore, since it is not necessary to reject, misreading resulting from alphabetic character crushing of an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark etc. can be reduced.
[0051] moreover, the alphabetic character with a voice sound symbol detected like the suitable example the image to which 23h of image limbs expanded the original image of a recognized alphabetic character, and out of the candidate alphabetic character -- and -- or a decision activity and correction of an operator can be made easy to perform in a configuration of that display an alphabetic character with a semivoiced sound mark on display 21b collectively, and alphabetic character decision section 23i determines a recognition result based on these.
[0052] 2. Gestalt drawing 4 of the 2nd operation is the explanatory view of the alphabetic character reading system 30 of the gestalt of the 2nd operation. It is the block diagram in which drawing 4 (A)

h g cg b eb cg e e

showed general drawing, and especially drawing 4 (B) showed the internal configuration of a character reader 31.
[0053] The alphabetic character reading system 30 of the gestalt of this 2nd operation consists of WS21 and a character reader 31.
[0054] Since WS21 is made with the thing of the same configuration as the gestalt of the 1st operation explained, it omits the explanation.
[0055] Moreover, a character reader 31 is equipped with control-section 23a, image buffer 23b, format buffer 23c, 23d of alphabetic character logging sections, character recognition section 23e, 23f of matching result candidate preservation sections, and 23g of voice sound symbols and semivoiced sound mark alphabetic character detecting elements like the gestalt of the 1st operation.
[0056] Furthermore, the character reader 31 of the alphabetic character reading system 30 of the gestalt of this 2nd operation is equipped with amendment MEJI creation section 31a and alphabetic character decision section 31b as a description of the gestalt of the 2nd operation.
[0057] amendment image creation section 31a -- a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements -- an alphabetic character with a voice sound symbol -- and -- or when an alphabetic character with a semivoiced sound mark is detected, it operates. And based on at least two kinds of binary-ized thresholds, two or more amendment images are extracted from the original image of a current recognized alphabetic character (alphabetic character recognized [rejection schedule]), and the reading image stored in image buffer 23b in this case, respectively. ** also displays these amendment image on display 21b, respectively.
[0058] Here, a binary-ized threshold is a concentration threshold at the time of extracting an image from image buffer 23b. It is a concentration threshold when extracting the pixel more than a certain concentration from the alphabetic character field on image buffer 23b specifically decided by format information stored in format buffer 23c as an image of a recognized alphabetic character. The image for every value of the can be extracted by changing a binary-ized threshold (for details, it explains in the case of explanation of operation.). This binary-ized threshold is good to carry out a multi-statement so that the value which can create an image legible for the operator of an alphabetic character reading system may be included. These binary-ized threshold is that an operator inputs from a keyboard etc. whether it stores for example, in format buffer 23c beforehand timely etc., and is ready. Moreover, a binary-ized threshold is good to consider as the configuration which can change a value by (it contains also at the time of an activity), and the operator behind.
[0059] This amendment image creation section 31a is good more preferably to consider as the configuration which expands each created image and is displayed on display 21b. It is because an operator will become legible about the image for every binary-ized threshold if it carries out like this.
[0060] When considering as the thing of a configuration of carrying out the enlarged display of the image which created amendment image creation section 31a, the magnifying power of a original image is good to set it as the scale factor considered for an operator to be legible beforehand. This set point is good to store for example, in a format buffer. Moreover, the set-up scale factor is good to consider as the configuration which an operator can change into arbitration behind from input section 21of (containing also at time of activity), and WS21 a.
[0061] Moreover, alphabetic character decision section 31b chooses the final recognition result of the alphabetic character recognized [rejection schedule]. This alphabetic character decision section 31b is directions of the operator who looked at the above-mentioned amendment image displayed on display 21b, and determines the recognition result of this recognized alphabetic character. For example, an operator looks at the above-mentioned amendment image, and can do it with the configuration which inputs the alphabetic character according to it from a keyboard.
[0062] however, amendment image creation section 31a and alphabetic character decision section 31b -- it is good also considering each as following configurations.
[0063] That is, it considers as the configuration which also displays collectively the candidate alphabetic character which a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements detected on display 21b with the amendment image which changed the binary-ized threshold

and extracted amendment image creation section 31a from the original image of the alphabetic character recognized [rejection schedule]. And it is good to consider as the configuration which determines the character recognition result of the alphabetic character recognized [rejection schedule] based on the voice sound symbol and the semivoiced sound mark candidate alphabetic character, and the above-mentioned amendment image which combined alphabetic character decision section 31b with display 21b, and were displayed. In this way, it is because an operator can see to coincidence the voice sound symbol and semivoiced sound mark alphabetic character displayed on display 21b, and the amendment image (what was expanded is included) of the alphabetic character recognized [rejection schedule] if it sets, so it becomes easy to determine the just recognition result of the alphabetic character recognized [rejection schedule].

[0064] Next, that actuation is explained in order to deepen an understanding of the alphabetic character reading system 30 of the gestalt of this 2nd operation.

[0065] WS21 passes a character reader 31, the reading image acquired by the approach of arbitration, and the information, i.e., the format information, that the alphabetic character's existence location was defined beforehand. In a character reader 31, control-section 23a stores the above-mentioned reading image in image buffer 23b, and stores the above-mentioned format information in format buffer 23c, respectively. 23d of alphabetic character logging sections asks for the character position for reading from this format information, and they start the character pattern in every character from image buffer 23b based on this character position for which it asked. Character recognition section 23e performs character recognition processing, and answers this character pattern in a reading result at WS21. Moreover, 23f of matching result candidate preservation sections saves for example, the JIS character code of a candidate alphabetic character on the candidate alphabetic character and concrete target which character recognition section 23e extracted.

[0066] When character recognition section 23e mentions a candidate alphabetic character final as a recognition result out of the above-mentioned candidate alphabetic character by predetermined processing, the alphabetic character reading system 30 carries out character recognition processing about the following recognized alphabetic character.

[0067] However, when character recognition section 23e outputs a rejection signal as a recognition result about a recognized alphabetic character, a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements start actuation. And as compared with the code table a voice sound symbol and for for example, alphabetic characters with a semivoiced sound mark, it detects whether a voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements have an alphabetic character with a voice sound symbol, and an alphabetic character with a semivoiced sound mark in the candidate alphabetic character saved at 23f of matching result candidate preservation sections about this alphabetic character recognized [rejection schedule].

[0068] When an alphabetic character with a voice sound symbol and an alphabetic character with a semivoiced sound mark are detected, amendment image creation section 31a extracts an amendment image from the original image (image saved in this example at image buffer 23b) of this alphabetic character recognized [rejection schedule] using at least two kinds of binary-ized thresholds, respectively. This binary-ized threshold is good to store in format buffer 23c beforehand, for example, and to consider as the configuration which amendment image creation section 31a reads at the time of the need from there. In addition, it is still better to consider as the configuration which can change this binary-ized threshold by the operator.

[0069] Drawing 5 (A) and (B) are drawings explaining extract processing of an amendment image. making a binary-ized threshold into the 1st - the 3rd value X1, X2, and X3, 80, 85, and 90, for example, three kinds, scanning image buffer 23b, respectively (namely, 3 times -- scanning), and extracting three kinds of amendment images is shown in drawing 5 (A). moreover, the 1- from which drawing 5 (B) comes out, respectively, and is extracted by the case where the alphabetic character recognized [rejection schedule] is "BA" when a binary-ized threshold is made into the 1st - the 3rd value -- the 3rd amendment image 33a-33c is shown.

[0070] In this way, the extracted amendment images 33a-33c are displayed on display 21b, respectively.

In the case of this example, ** is also expanded and displayed. ** is also combined with a recognition result and is displayed. Drawing 6 is drawing having shown the example of a display. Since only the alphabetic character of "BA" was an alphabetic character recognized [rejection schedule], it is shown as an amendment image which is expanded about the alphabetic character and is different. The display "?" of the purport ** also indicates rejection to be as a recognition result of the alphabetic character of "BA" is displayed. however, the alphabetic character with a voice sound symbol detected as this recognition result by the voice sound symbol and 23g of semivoiced sound mark alphabetic character detecting elements -- and -- or an alphabetic character with a semivoiced sound mark may be displayed.
[0071] Since the images of a recognized alphabetic character "BA" are the amendment images 33a-33c in the case of the example of this drawing 6 , the operator of an alphabetic character reading system turns out that this alphabetic character is an alphabetic character recognized [rejection schedule]. And these amendment image is seen and the recognition result of this recognized alphabetic character can be determined. For example, a recognition result can be determined by the approach of inputting the alphabetic character corresponding to this image from a keyboard etc.
[0072] According to the character reader 30 of the gestalt of this 2nd operation, when the recognized alphabetic character of a rejection schedule has possibility, such as an alphabetic character with a voice sound symbol, the amendment image by binary-ized threshold which is different from the original image of that alphabetic character is extracted automatically, and they are displayed on a display. Therefore, an operator looks at the legible (it is the optimal) amendment image in these amendment image, and can perform suitable processing, for example. For example, it can process that an operator inputs a right character code etc. Therefore, since it is not necessary to reject, misreading resulting from alphabetic character crushing of an alphabetic character with a voice sound symbol or an alphabetic character with a semivoiced sound mark etc. can be reduced.
[0073] moreover, the alphabetic character with a voice sound symbol in which amendment image creation section 31a was detected the amendment image of a recognized alphabetic character, and out of the candidate alphabetic character like the suitable example -- and -- or a decision activity and correction of an operator can be made easy to perform in a configuration of that display an alphabetic character with a semivoiced sound mark on display 21b collectively, and alphabetic character decision section 31b determines a recognition result based on these.
[0074] In ****, the gestalt of operation of the alphabetic character reading system of this invention was explained. However, these invention is not limited to the gestalt of above-mentioned operation at all, and can make many deformation or modification.
[0075] For example, with the gestalt of the above-mentioned 1st and the 2nd operation, in order that the alphabetic character logging section might start an alphabetic character from an image buffer, the example which uses format information was explained. However, the alphabetic character logging technique is not restricted to this example, but is good by arbitrary suitable approaches. For example, you may be the technique the alphabetic character logging section itself scans an image buffer, it detects the boundary in every character, and starts an alphabetic character based on it.

[Translation done.]

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damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing explaining the 1st whole alphabetic character reading system 20 configuration of the gestalt of operation, and the internal configuration of a character reader 23.
[Drawing 2] It is drawing explaining a candidate alphabetic character.
[Drawing 3] It is drawing explaining the example of a display displayed on a display with the gestalt of the 1st operation.
[Drawing 4] It is drawing explaining the 2nd whole alphabetic character reading system 30 configuration of the gestalt of operation, and the internal configuration of a character reader 31.
[Drawing 5] It is drawing explaining the processing which extracts an amendment image.
[Drawing 6] It is drawing explaining the example of a display displayed on a display with the gestalt of the 2nd operation.
[Drawing 7] It is the explanatory view of the conventional technique.
[Description of Notations]
20: The alphabetic character reading system of the gestalt of the 1st operation
21: Workstation
21a: Input section
21b: Display
23: Character reader
23a: Control section
23b: Image buffer
23c: Format buffer
23d: Alphabetic character logging section
23e: Character recognition section
23f: Matching result candidate preservation section
23g: A voice sound symbol and a semivoiced sound mark alphabetic character detecting element
23h: Image limb
23i: Alphabetic character decision section
30: The alphabetic character reading system of the gestalt of the 2nd operation
31: Character reader
33a-33c: Amendment image

[Translation done.]

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damages caused by the use of this translation.

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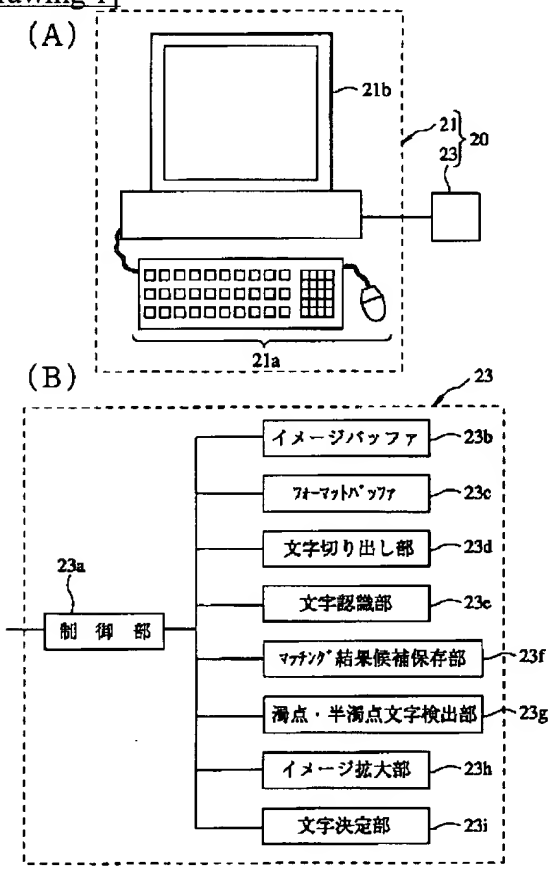
DRAWINGS

[Drawing 1]



20 ：第1の実施の形態の文字読取システム　21：ワークステーション
21a：入力部　21b：表示部　23：文字読取装置

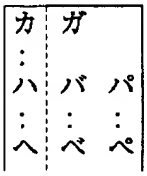
第1の実施の形態の説明図

[Drawing 2]

(A)

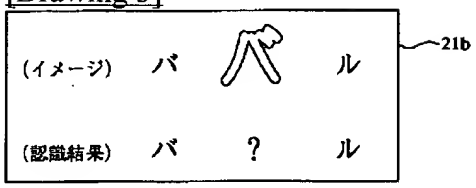
	第1位	第2位	第3位
「バ」の認識結果	バ	パ	ハ
「ベ」の認識結果	ベ	ペ	ヘ
「ル」の認識結果	ル	レ	ハ

(B)



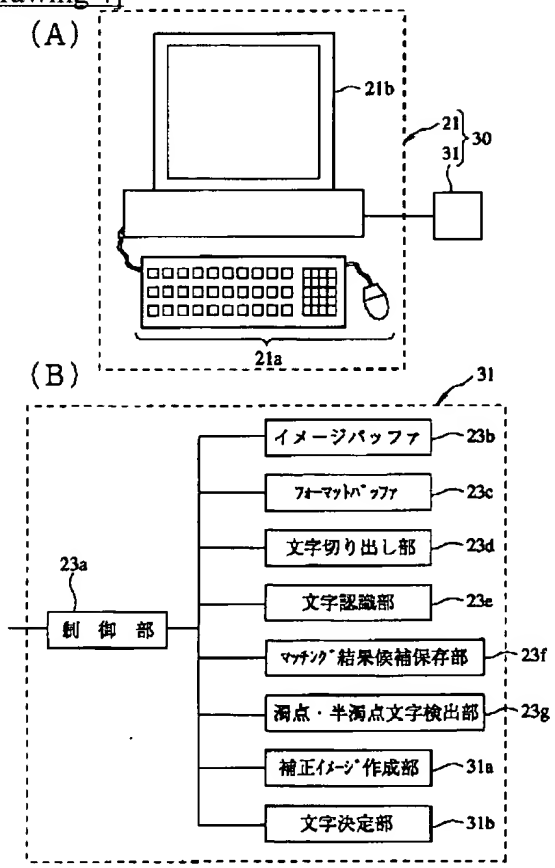
候補文字を説明する図

[Drawing 3]



表示部に表示される表示例を説明する図

[Drawing 4]



30 ：第2の実施の形態の文字読取システム　21：ワークステーション
21a：入力部　　21b：表示部　　31：文字読取装置

第2の実施の形態の説明図

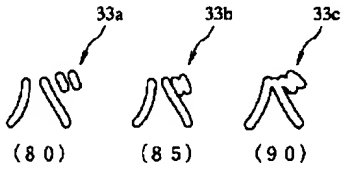
[Drawing 5]

(A)

スキャン回数	3
2値化閾値	80、85、90
:	:

(読取フォーマット情報)

(B)

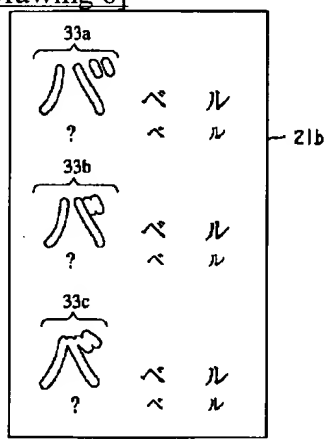


(読取イメージ)

33a～33c：第1～第3の補正イメージ

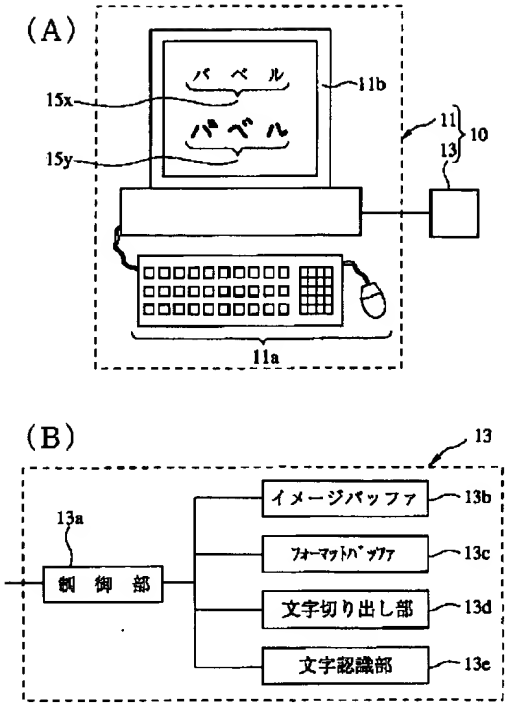
補正イメージを抽出する処理の説明図

[Drawing 6]



第2の実施の形態での表示例を説明する図

[Drawing 7]



従来技術の説明図

[Translation done.]

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